THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXII. No. 1845.] LONDON, SEPTEMBER 20, 1898. [50TH YEAR. PRICE 6d.

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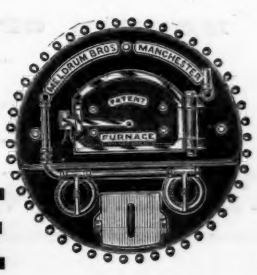

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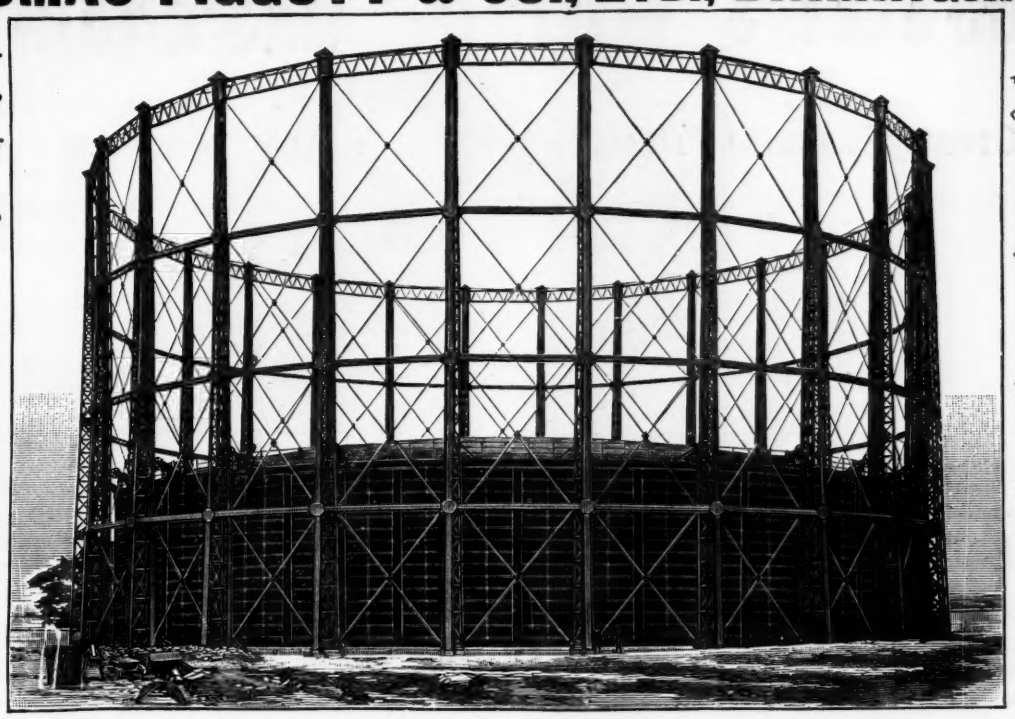

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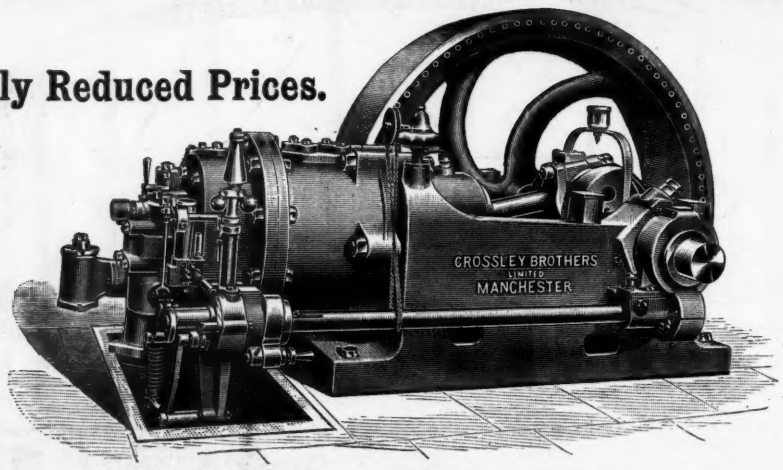

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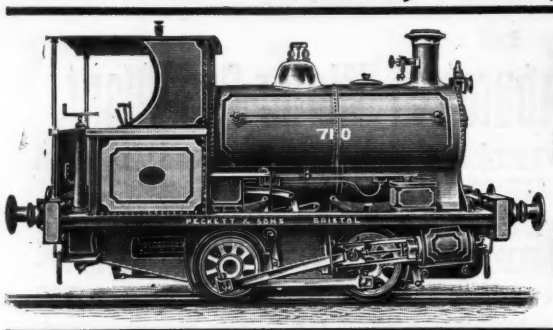

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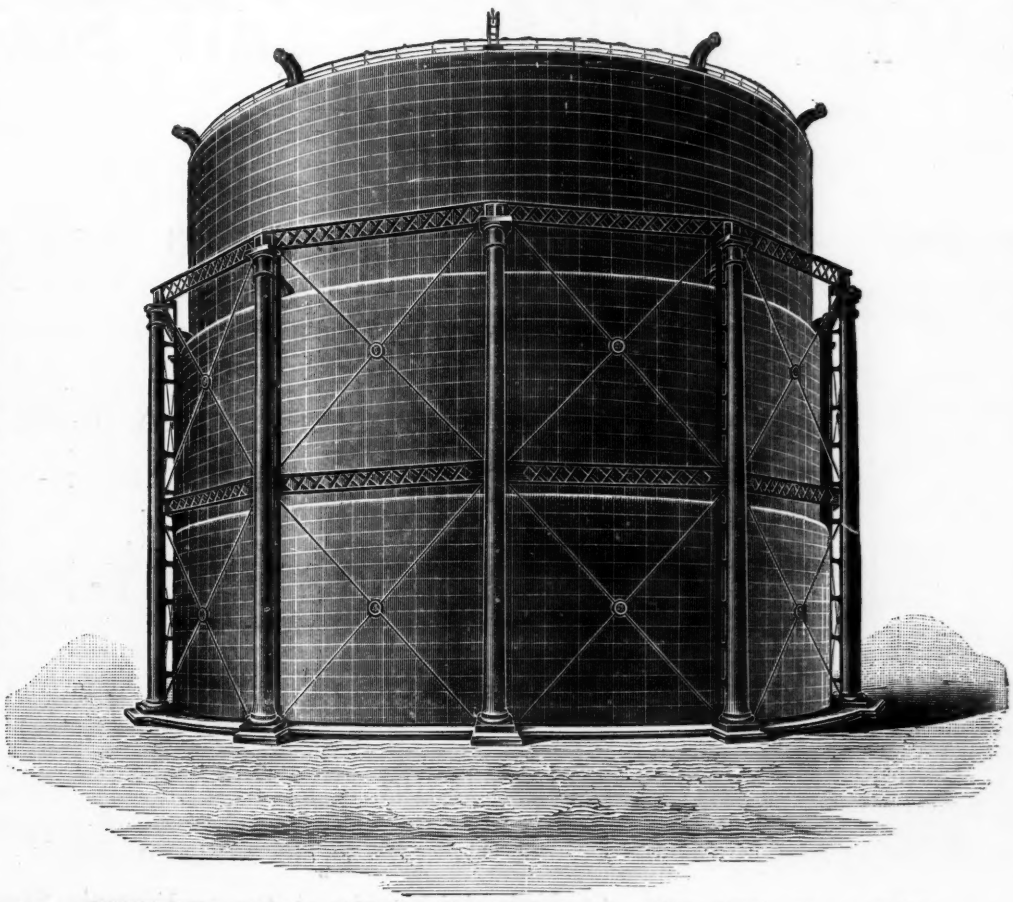

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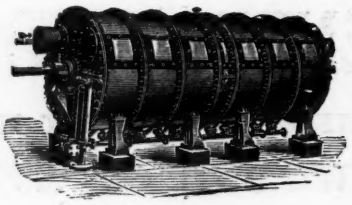

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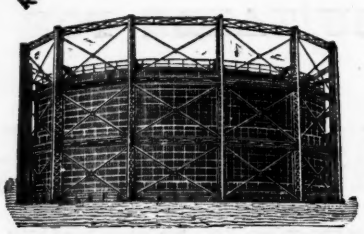

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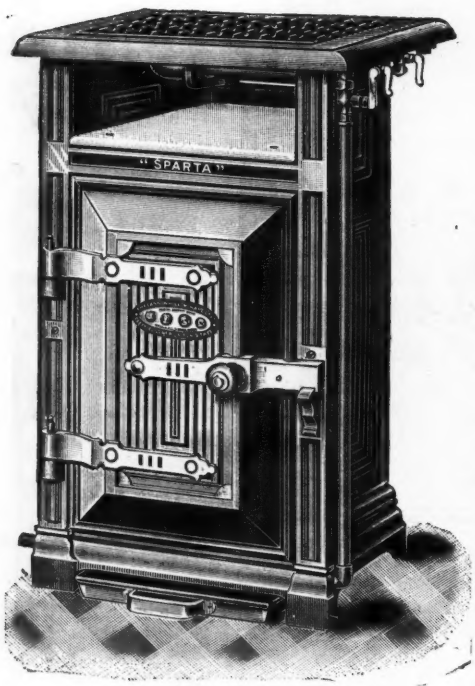

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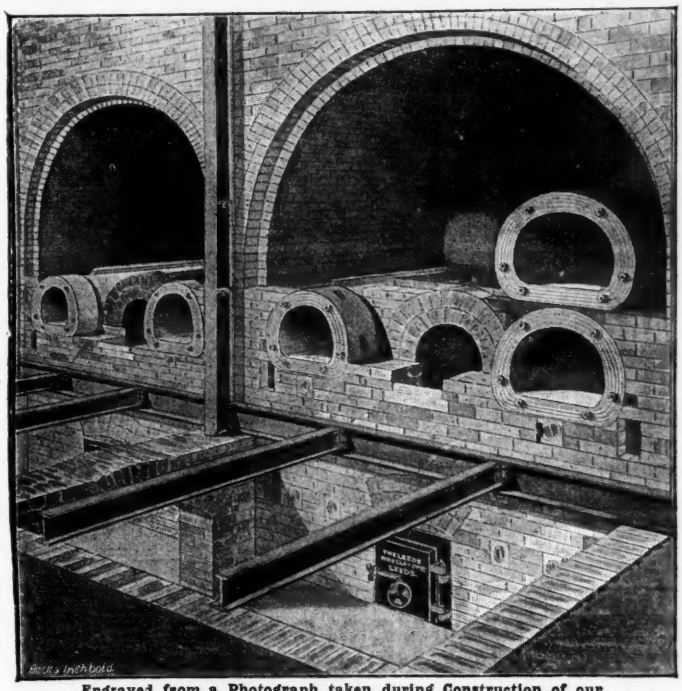

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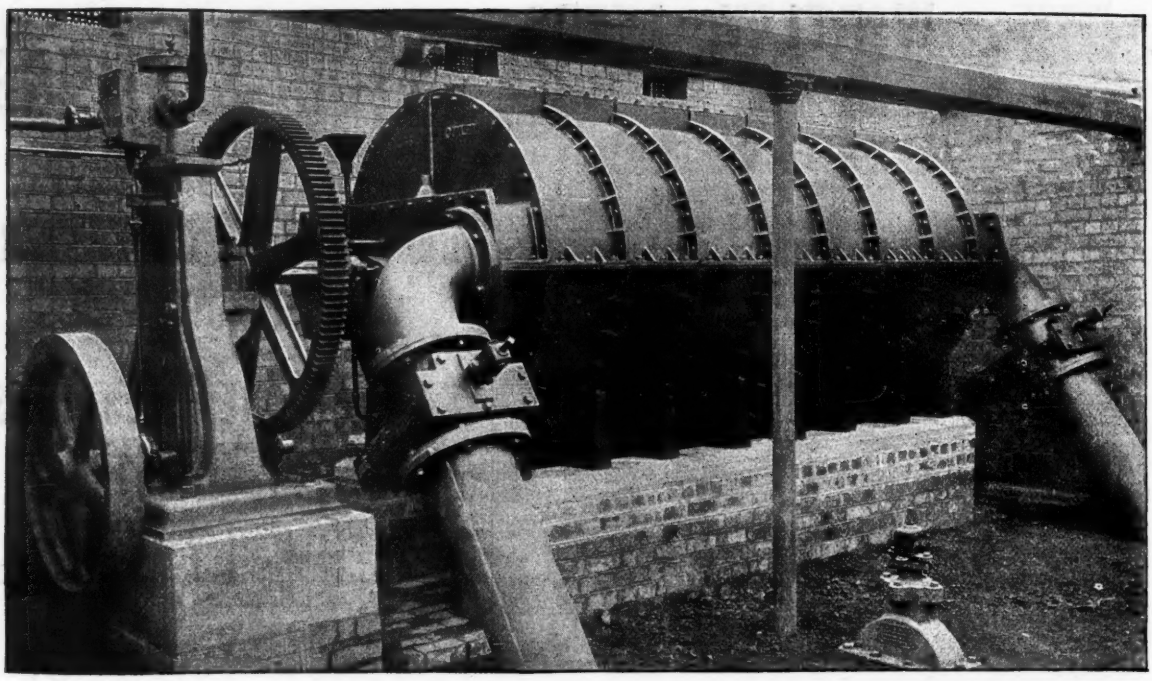

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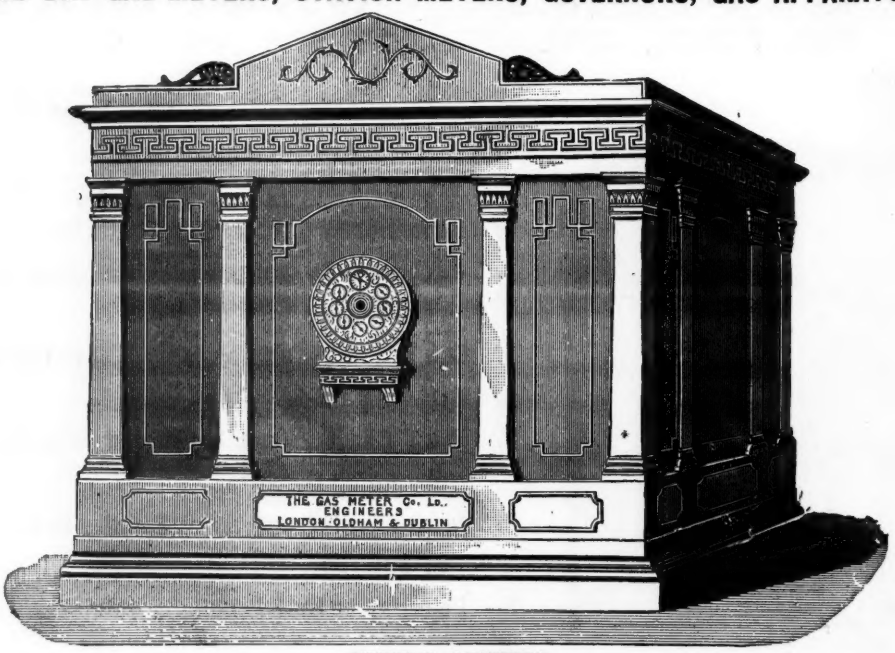

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Swansea	750,000
Manchester	3,000,000
Brighton	1,750,000
Preston	1,500,000
New York	1,200,000
Southport	750,000
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Newburgh, N.Y.	350,000
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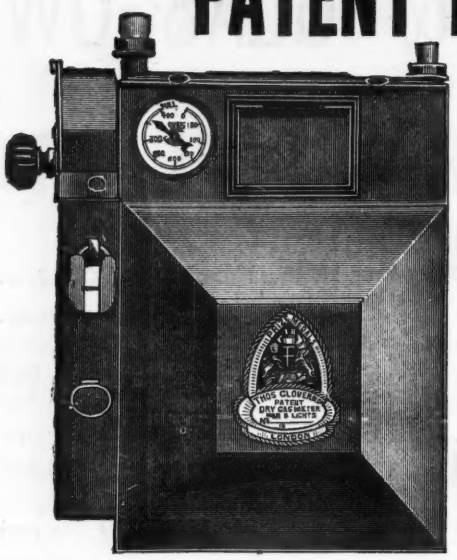

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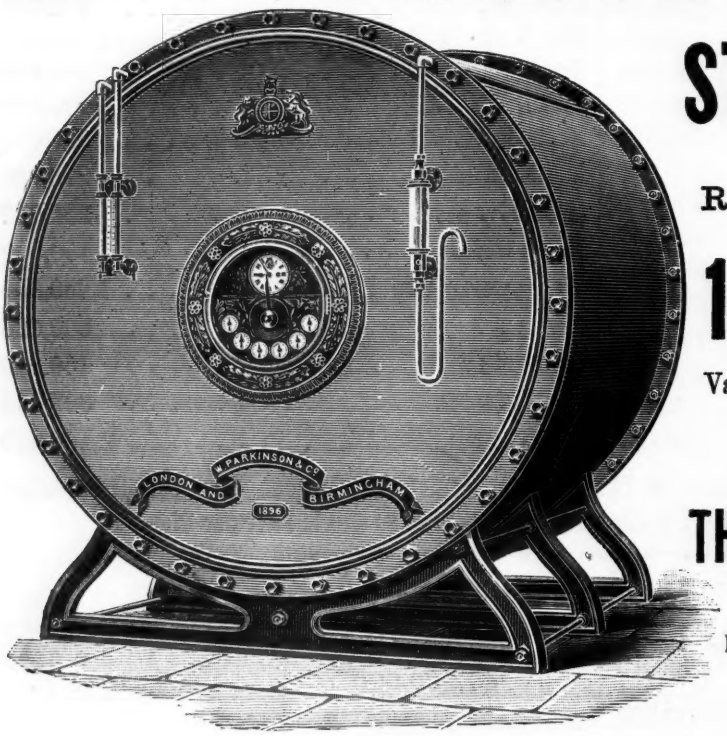

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EDITORIAL NOTES.

Strikes and Sundry other Aspects of Trade Unionism.

ANOTHER strike has broken out suddenly, and provided the newspapers with welcome matter. We allude to the absurd revolt of the horsekeepers on the North Metropolitan tramway system, which is only noteworthy here because the strikers pretend to have the aid and comfort of the London County Council in their practical protest against the management. It is to be supposed that the particular trouble will be all over by the time these lines see the light; the very fact of Mr. John Burns, M.P., having been reported as favouring the strike being sufficient to damn it. When the London County Council meet after the holidays, there will be some awkward questions asked as to the conduct of certain members who are reported to have interfered with the "quiet enjoy-"ment" of the tramway property, which is leased of the Council by the Company. The mischief grows out of the practical working of the "fair wages" clause in the County Council contracts. The trouble over this clause is only beginning, as local authorities all over the country will soon discern. The London County Council found their Trade Union-inspired contract conditions an obstacle to their doing business with Messrs. Yarrow; and it remains to be seen how the leased tramways can be worked under the same interfering influence. The Wigan Corporation are confronted by trouble of the same kind. On the face of it, the desire of public bodies to exclude "sweating" firms from their list of contractors is laudable. The "underseller" who takes work that can only be done at his price by swindling all parties concerned, including the workpeople, does not deserve any encouragement; but the practical difficulty lies in the execution of a "fair dealing" clause without making it an agency for the propagation of Trade Union tyranny.

While on the subject of trade unionism, we desire to note that a most trenchant criticism of the recent Trade Union Congress has been furnished to the "Engineer" by Mr. J. Stafford Ransome, who has done so much to expose the fallacy that "organization" is good for workpeople. He calls it a "conference of the professional labour "agitators;" and remarks how at these annual meetings "nothing is done, no work is effected, no tangible policy "is agreed upon that can either assist trade, or trade "unionism, or labour, or anything else." Yet the congress, hollow mockery that it is, has its uses, especially in respect of the light it throws on the character of the delegates and their performances. To begin with, Mr. Ransome shows that these so-called representatives of the working man do not represent him at all. There are 15 millions of what are called the working classes in Great Britain. The delegates at Bristol claimed to represent 1,200,000 working men and women—that is, less than one-twelfth of the British working classes. But the case is not even so good as this; for the delegates are not elected by the ordinary members of their Unions, but by "a handful of "minor Trade Union officials who are all most anxious "to become delegates one day themselves, and whose "retention as salaried Unionists is dependent on the very "men whom they elect as delegates." Hence the delegates adequately represent only themselves and the rest of the paid element in the Trade Unions to which they are attached. Assuming the Trade Unions represented at the Bristol congress to have among them 60,000 paid officers of different grades, then "we have in the Trade Union "Congress a Labour Parliament adequately representing "the views of 1-250th portion of the working population "of our country; it being taken for granted that a paid "Trade Unionist should be considered as a real working "man." Mr. Ransome is sarcastic about the hackneyed matter that constituted the bulk of the presidential address; and he agrees with us in regarding as the most interesting points in this composition its references to the Workmen's Compensation Act and the engineers' strike. Stress is laid upon the evidences supplied by the congress debates that the Trade Unions and their professional leaders are of no use to working men; and the following conclusions are formulated as all that the week's talking and voting by the delegates really amounted to: "(1) They consider that "their trade unionism as at present carried on by them is "practically useless. (2) They do not believe in their own "Parliamentary Committee. (3) They do not believe in

"their own labour members of Parliament. (4) They do "not believe in each other. (5) They consider that the "control of the legislation of the country should be handed "over to them." It is a strong indictment; but not one whit too strong in the circumstances.

The last bit of Trade Union news for the week is a tale of the result of an iron-workers' strike in Pennsylvania. The strike was over the refusal of a manufacturing company to sign a union scale of wages, which was put forward upon the principle, heard of so much in South Wales of late, that "wages should govern prices." The Company procured other labour; and the strikers arranged to start a co-operative mill on their own account. A very laudable resolve; but, remarkable to relate, when the millworkers applied to be taken on at the co-operative works, they found that the management refused to sign the union scale of wages! Comment would only spoil this truly magnificent story. It is apparently genuine. It was the Scottdale Iron and Steel Company whose men struck for the "principle;" and the Old Meadow Rolling Mill is given as the name of the co-operative concern which the strikers declined in their turn to run on Trade Union lines.

The Gas Supply of Sheffield—A Case against Municipalism.

THE half-yearly general meeting of the Sheffield United Gas Company was held under the presidency of Sir F. T. Mappin this day week, when the shareholders were bidden to rejoice in the existence of a very satisfactory condition of affairs. Although the price of gas had been reduced, the dividend was covered by the profit for the half year. An interesting piece of intelligence in this connection is that when the price of gas is reduced, the staff receive a bonus of 10 per cent. upon their salaries. Altogether, the accounts show that the Company are doing well for themselves, and excellently well for Sheffield. As usual, the Chairman's speech was full of characteristic touches. After disposing of the matters arising out of the half-yearly accounts, Sir F. Mappin took up a challenge of a Sheffield newspaper that raised the general question of whether it is not better, in the general interest, for gas supply to be municipalized. The challenge was expressed as follows: "We know of no one instance in which the transference "of gas-works from trading companies to the municipal "authorities has not been to the marked gain and the "unchallenged satisfaction of the community in which the "change has taken place. If anyone knows of a case to "the contrary, we invite him to name it." This is a pretty safe way of mooting the point; because those communities that have municipalized their gas undertakings must make the best of it in any case. As Chairman of a Gas Company, however, Sir F. Mappin undertook to show the other side of the picture, and to prove by the example of Sheffield that there is little advantage for the gas consumer in the much-vaunted operation in question. This he did by comparing the reductions in the price of gas at Sheffield during the last few years with the practice of Birmingham and Nottingham, drawing the conclusion that "Sheffield gas consumers had been more fortunate in "deriving their gas supply from a Company than the con-"sumers in other large towns where the works were in the "hands of the Corporation." Sir F. Mappin is usually to be trusted to bring out and rub in facts of this description. There is no getting over the fact that the Sheffield gas consumer can get his supply of 17¾-candle gas at from 1s. 10d. to 1s. 6d. per 1000 cubic feet, according to the amount of his consumption; while most Municipalities think their gas "cheap enough" when it is at least 6d. per 1000 cubic feet dearer.

Gas Affairs at Leeds and Bradford.

AT last it looks as if Leeds were going to pluck up heart of grace, and make the magnificent reduction of 2d. per 1000 cubic feet in the price of gas, to date from the beginning of next year. As will be seen by the report published in another column, at the last meeting of the Corporation Gas Committee the Chairman (Mr. Lowden) carried a resolution to this effect. The Committee were unanimous, which was the best possible preparation for the inevitable battle in the Council over the proposal. We desire to deal as tenderly as possible with this momentous affair of the cheapening of Leeds gas, because experience shows that it is a most difficult matter to get a Corporation to reduce the price of gas, when once a few of the members have got it into their heads that the price is "cheap "enough." It has been a local superstition in Leeds that the town's gas is very cheap; and when the price is down to 2s. per 1000 cubic feet, without meter-rents, and with 5 per cent. discount for cash, Mr. Lowden flatters himself that the supply will "perhaps be the cheapest in the kingdom." It is a laudable ambition to sell the cheapest gas in the kingdom; but it will hardly be realized by the step now in contemplation in the case of Leeds. Sheffield is not so far off that the selling prices of gas there can be overlooked by consumers of Leeds gas. Mr. Lowden's speech to the Committee is a good example of the laborious way in which a proof of the safety of making a reduction in the price of municipal gas has to be clinched at all points. The Chairman did not lay sufficient stress upon the prospect that the estimated loss of revenue by the reduction of price would be recovered by a greater return; and this is rather a pity. To say that a reduction of price means a decrease of revenue of £21,000 a year is an alarming way of putting it. But if it is shown at the same time that the decrease is not likely to be realized by reason of the expansion of business—as in the case of Sheffield—the matter has a different aspect. Cheap gas is as much a need of Leeds as of other localities; and the Corporation will be well advised if they let the townspeople see that in this respect there will be no shortcoming.

Another Yorkshire town—Bradford—is on the eve of an important development of its municipal and gas politics. There is a grand scheme afoot for the extension of the borough; and the Corporation are quite willing to give the Local Government Board an assurance that they will apply for powers to purchase every Gas Company supplying a district which might be annexed to Bradford. There are three gas undertakings of considerable importance to which this engagement would apply. The movement would receive public support in the localities affected; and it is not likely that old Bradford would object. It is a coincidence that just when this expansion is being thought of, the consumption of gas in the present city should show a slight decrease. It is true that the falling-off is only about 2½ per cent., which is referred by the Mayor (Mr. Thomas Speight) to "mild winter, bad trade, "the extension of the system of incandescent gas lighting, "and also to some extent to the progress of electricity in "the city." He thought, however, that the last-named is a "very slight" item. When the supply of the added districts is taken in hand, the Corporation will have to face a financial problem which may necessitate their dropping the gas profits for a time—if not in perpetuity. The electric lighting of the city is done practically at cost price; and the consumers of gas ought to receive the same treatment as the users of electric lamps. Bradford should certainly have as "Progressive" a gas policy as that governing the electricity department.

The Telephone Committee on Municipal Trading.

IT could scarcely be supposed that the editorial department of the "JOURNAL" would be under any obligation to study, in the interest of habitual readers of these columns, such an obviously foreign document as the report of the Select Committee on Telephones. We candidly confess that the report escaped notice, until interest in it was excited by a passing remark of Mr. Pearson, a Bristol Town Councillor, who read a paper on Municipal Trading at the British Association meeting. Mr. Pearson claims to be a municipal trader who believes in the profit-making side of municipal enterprises; and he objected in his paper to a passage in the Telephone Committee's report which "shadowed forth" a restriction on profit-making. This reference sent us to the report in question, for further information. The search did not reveal very much; but what there was, was to the point. The Committee considered that a telephone service might be undertaken by a Local Authority; but only under conditions differing widely from those under which the National Telephone Company carry on their business. The observations of the Committee in this regard are instructive, so far as they bear upon the much-discussed problem of the ethics of competition between a public authority and a private undertaker. It is laid down that where a Company are actually doing business, municipal competition, if permitted, should be conducted so far as possible on equal terms. As regards a telephone service, however, it would be difficult to put a Local Authority on equal terms with the Company in possession. The sole "pull" which the Local Authority would have over the Company would

be the right to give to themselves, and refuse to their rival, permission to lay wires under the public streets. This is a trifling matter in the case of a telephone service, which is mainly carried on by the agency of overhead wires. It is outweighed by the superior freedom in bargaining possessed by the Company. If a Local Authority established a public telephone service, this must be subject to the requirements of the Post Office, must be governed by a maximum rate, and no opportunity could be afforded to Local Authorities "to carry on the service with a view to "lighten the burden of local taxation." Here we have the kernel of the matter, as it concerns ourselves and our readers. The Telephone Committee must have been deeply impressed by the practice of so many English Municipalities in making the consumers of their gas bear a heavy burden of indirect taxation; and they were agreed that the telephone service, if it ever came into the same hands, should not similarly suffer. This is, indirectly, the strongest parliamentary condemnation of the principle of municipal trading at a profit that has yet been placed upon record. The Committee find that competition with the National Telephone Company is desirable in the public interest; but they cannot trust Local Authorities to institute a real and effective competitive service, because of their hunger after "profits." So inspired, a Municipality might even agree with the Company to share the plunder between them, and resist an extension of the service by the Post Office. The earnest attention of profit-making Municipalities may be directed to this consideration. They will perceive by it that, for the sake of a problematical gain, to be dissipated belike by their own spending departments, they have forfeited the confidence of Parliament in the reliability of municipal institutions to conduct their operations with a view to securing the greatest benefit to the community. It is, really, a serious indictment.

The Meeting of the Eastern Counties Association.

THE Eastern Counties Gas Managers' Association met at Romford, Essex, last Thursday, under the presidency of Mr. W. D. Child, whose Inaugural Address will be found in another column. It is a composition of a severely practical character. Mr. Child expressed the general opinion of the profession when saying that there are quite enough gas managers' associations in the country. He might even have gone further, and hinted that a reduction of the number by amalgamation would be hailed with general satisfaction. Mr. Child made another good point in drawing attention to the comparative scarcity of gas managers who have worked their way through the chemical laboratory, as contrasted with the number of those whose early training has been in the way of mechanics. Romford supplies an example of a town where the old gas-works have been replaced by a new station, without overcharging the capital account. The President showed how this process was effected. He professed a liking for carburetted water gas, and is ready to adopt an auxiliary plant for making it under certain conditions. The whole of the address was marked by admirable candour, and was inspired by a praiseworthy desire to impart information based upon the facts of experience. Mr. Child is to be congratulated upon his address; which will considerably enhance his professional reputation. The rest of the business meeting was devoted to a discussion, opened by Mr. H. Wimhurst, on the Workmen's Compensation Act. The next meeting will be held in Cambridge.

General Lessons from the British Association Meeting.

AN interesting and instructive meeting of the British Association has drawn to a close amid a chorus of mutual congratulations. Bristol has surpassed itself in the matter of hospitality to the more or less learned men who have attended the meeting; and the visitors in return have filled the local newspapers with a vast flood of scientific "copy." One or two criticisms of a general character have been applied to the proceedings of the Association, and may be repeated here for the sake of the instruction they convey to all who at any time have to read papers or deliver addresses at scientific or technical gatherings. We have already drawn attention to the President's utterance respecting the composition of Inaugural Addresses. Another criticism, both of addresses and papers, is offered by "The Times." It is observed that there is a deplorable separation between the literary and scientific culture of the age. There are in our midst plenty of people who, in any literary sense, must be described as educated, yet whose ignorance alike of science and of scientific methods and reasoning is amazing. There is too frequently an almost equal ignorance of literature among men of science; but usually the latter are able to express themselves lucidly and adequately. One faculty is almost as valuable to the world as the other; and there is ample need for both. It is unfortunately true that "multitudes are ready to draw conclusions when they have "no proper power of judgment in the cases." What is wanted by the world at large is the encouragement of scientific methods of thought, which is possible without accepting as proved all the teachings of contemporary science. It is declared to be desirable, however, that "leaders of science would themselves become sufficiently "literary, to avoid offending the ears of scholars by a "barbarous, unintelligible, and unnecessary nomenclature." This is an old grievance. Men of science and technicians, unlike literary men, are constantly in need of fresh words to designate new things. When the necessary word does not exist, it has to be made; and it must be conceded that the result is frequently terrifying. "Men of science who "are imperfectly acquainted with English, but who have "retained from their school days some small smattering of "Greek, make up words . . . . . and then proceed to "define the meanings which they attach to them, and which "other folk are expected to remember." And when the learned gentlemen who read the papers containing these monstrous appellations do not "speak up," the grievance for those who desire to follow the flow of contemporary science from the fountain-head is serious indeed. There must be a scientific and technical nomenclature; but a robust common-sense, with perhaps a sense of humour, will always save those who have to employ it from being either unintelligible or ridiculous.

Close of the Acetylene Exhibition at the Imperial Institute.

THE Acetylene Exhibition at the Imperial Institute was brought to a conclusion on Thursday last, the 15th inst. It has been open for precisely three months, in accordance with the scheme of the original programme. The lighting of the Intermediate Gallery by acetylene was continued, and all the exhibits were *in situ*, up to the last day of the exhibition, though during August there were very few visitors to the Institute. There is no doubt that the opening day should have been fixed for a month earlier than June 15, had it been possible to have the exhibits in place by that time. Nevertheless, exhibitors seem well satisfied with the results achieved; and we understand that a fair amount of business has been transacted by many of them. Turning from the commercial to the educational purpose of the exhibition, we believe that it has rendered good service. It has shown the world at large that an illuminant of the safety of which many were sceptical can, in proper hands, be prepared and employed on an extensive scale for three months without a single mishap. This practical demonstration of the good behaviour of the new gas will do more towards establishing and consolidating the acetylene industry than volumes of praise from interested parties. The authorities of the Society of Arts and of the Imperial Institute are to be congratulated on the successful issue of their joint efforts to give a public display of the potentialities of the new illuminant. We look forward with great interest to the appearance of the official report on the exhibits.

WATER AND SANITARY AFFAIRS.

WITHIN a very much shorter period than was at one time thought possible, the work of connecting the Southwark and Vauxhall system with the East London by means of the Tower Subway has been successfully completed, the task being finished on Sunday last. Great credit is due to all parties concerned, and important relief will thus be given to the district in which the supply has been restricted, though an intermittent service appears inevitable until there is some considerable augmentation of the rainfall. While success has thus attended the exertions put forth to counteract in some measure the effects of the terrible drought, the agitation which has arisen is not likely to cease. The controversy between Mr. Beachcroft and Mr. Stuart, to which we referred last week, has been prolonged by a second letter on either side, published in "The Times." Mr. Stuart evidently seeks to convince the public that the

East London Company might have prevented all shortcoming in the supply, had they immediately exercised the powers they obtained in 1897, for uniting their mains with those of other Companies, so as to obtain a larger supply for the benefit of the district in time of extremity. Here, according to Mr. Stuart, was a sufficient remedy. It is curious that such a plan was never promoted and pressed forward by the London County Council. The proposal laid before Parliament emanated from the Company, who sought for unrestricted power to enter into contracts, agreements, and arrangements for the purpose of using the works of other Companies in order to supplement their own. What could have been more in the interest of East London as a protection against the results of drought? But, as Mr. Beachcroft states, this most desirable plan was strongly opposed in Parliament by the County Councils of London and Hertfordshire. Hard pressed, the East London Company yielded, and allowed a proviso to be introduced, by which it was stipulated that the extra supply should only be available in cases of emergency, and with the consent of the Local Government Board. The drag was thus put on, and impeded progress. Had the Company proposed in the Midsummer of last year to unite their mains with those of the Southwark and Vauxhall Company, which they have just now successfully accomplished, what would have been said to it by the County Council? That body would doubtless have urged that the "emergency" required in the proviso had not yet arrived, and that the clause gave no power to proceed until the emergency was actually present. The Company can always be opposed on some ground or other. They are either too early or too late. When the East London Bill was before the House of Commons in the session of 1894, Mr. Stuart moved its rejection, arguing that the Bill was "unnecessary and not urgent," a view supported by Mr. Shaw Lefevre and the member of Parliament for the Tower Hamlets. Now in the matter of junctions the Company are blamed for not having discerned "emergency" before it arrived; and when the crisis has become too evident to be longer denied, the efforts of the Company to supplement their supply are denounced as "belated." As we argued a little time ago, it is to the Company and not to the Council that the people of East London are indebted for the water they now receive. The Bill of 1894 was carried by a bare majority of one; and had it been rejected, the present restricted supply of over 20 gallons per head daily could not have been given, but in its place there would have been a "water famine" only too worthy the name.

Mr. Stuart now makes the whole question of the East London supply turn upon this one point—the junction of mains. But who proposed this junction; and who threw difficulties in the way? To unite the various water systems of the Metropolis so as to render them mutually helpful, would have been a project adapted to fire the enthusiasm of the Progressive party in the County Council, had they really been anxious to benefit the consumer. But they left this enterprise to the Water Companies, and when one of the latter made an attempt to carry it out, the Council first opposed the scheme, and afterwards strove to strangle it. At one of the so-called "indignation" meetings in East London, we find Mr. Stuart making a speech in which he says that the East London Company are "simply playing for purchase." We rather think such a phrase would well describe the policy of the County Council. What Mr. Stuart really intended to signify by these words is perhaps doubtful. There is a very curious rumour abroad that the Local Government Board have a project, to be laid before the Cabinet, by which the East London Company are to be subjected to a compulsory sale of their undertaking; the other Companies being left where they are. We need hardly say that most serious objection lies against any such proposal—all the greater if the property is to be handed over to the County Council, and fraught with confusion let the ruling power be what it may. If there is to be purchase it must comprehend all the Companies, or a most unequal and unjust form of competition will be introduced. Of course the County Council will fight to the death against any proposal for creating a special Board to deal with the water question. But what the public are to gain in either case is not clear; for whether the Council or a newly created body is placed in the position of the Company, that will not bring down rain from heaven.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 654.)

On the Stock Exchange last week, things went from bad to worse. To the depressing influences marking the close of the preceding week were added the Fashoda incident, and the critical position of the French Ministry. So that, from the opening, the tendency was flat. And this was accentuated by growing fears lest a considerable drain of gold should set in. About Thursday, some reaction from the state of uneasiness supervened, and things looked brighter. But there was not much recovery; and the week closed dull. Prices generally are down, though there is no serious fall. The supply of money was abundant; and the requirements of the Stock Exchange settlement make no impression, but discount rates were better. In the Gas Market, there was a welcome increase in the volume of business transacted, though it would still bear a considerable augmentation without exceeding moderate limits. It was for the most part confined to the big issues, which showed out firmer. The general tendency was good, though actual changes in quotation are few. In Gaslights, the "A" was much more brisk; and, after some hesitation at first, it took an upward course—rising from 289 on Monday to a closing mark of 295 on Saturday. There was a moderate amount done in the secured issues at fair prices. South Metropolitan was pretty active; and though it did not advance, the last prices were the best. There was nothing to notice in Commercials. The Suburban and Provincial Companies were as quiet as they well could be; and they made no sign. Brightons were made practically easier on *ex div.* quotation. Among the Continental undertakings, Imperial had a further rise on the strength of rumours from Vienna, which seem to require some degree of confirmation; and European advanced. None of the rest presented any feature calling for notice. Business in Water stocks was even more limited than in the preceding week, and movements were the same as then. East London had a slight reduction, and New River a slight advance.

The daily operations were: Business in Gas was more brisk on Monday than it has been lately. Imperial Continental improved 2. Transactions on Tuesday were about on the same scale; but Gas quotations did not move. In Water, East London fell 2. There was somewhat of a lull on Wednesday; but the tendency was good despite the lack of support, and Gaslight "A" advanced 2. Business remained on Thursday at about the same level in point of volume. Prices were quite steady, but not really strong enough to push quotations up. Friday was firm and buoyant; and prices held up their heads well. Imperial advanced 1; and European part paid, ½. In Water, East London fell 2; but New River gained 1. On Saturday, the tendency remained good. Gaslight "A" rose 1. In Water, New River further advanced 1.

ELECTRIC LIGHTING MEMORANDA.

The Prospects of Artificial Nitrate of Soda produced Electrically—Councillor Pearson, of Bristol, on Municipal Trading—The Correct Principle in Municipal Trading.

The Presidential Address of Sir W. Crookes to the British Association revealed electricity as the good spirit who at the proper time will be available to save the earth from starvation by supplying all the artificially-made nitrate of soda required for manuring corn crops. The centre of this new manufacture will be at Niagara; and it must be a great consolation to the power company who are exploiting this "water privilege" to know that at last there is something for them to make in any quantity they like. Sir W. Crookes says that Lord Rayleigh has effected the electrical burning out of nitrogen from the air, so as to leave argon behind, at such a rate that he (Sir W. Crookes) could see a product of a ton of nitrate of soda for the consumption of 14,000 units of electricity. In making this statement, the President of the British Association followed Lord Beaconsfield's advice in regard to making interesting conversation—he gave results, omitting the steps leading up to them. It is to be understood, however, that by the Crookes-Rayleigh process, atmospheric nitrogen is to be burnt to nitric and nitrous acids; and these are to be fixed with soda so as to form the nitrate of this base. Taking steam machinery as the motive power, the cost of the unit of electricity is estimated at ½d. A "ready reckoner" does the rest of the presidential calculation. At Niagara the cost of the unit is so considerably reduced that it can be sold "at a profit" for one-seventeenth of a penny. "At this rate, nitrate of soda would cost not more than £5 per ton." So there you are! Seeing that the natural product is quoted at about £7 10s. per ton on the spot, the question suggests itself—Why not start the manufacture at once? Lord Rayleigh's laboratory results are a slender foundation for Sir W. Crookes's computations. It is only reasonable to suppose that if the Niagara power people once grasped the principle of the combination, they could do the work on a large scale at considerably under the original laboratory figure. Then,

why not? Is it really true that artificial nitrate of soda can actually be put upon the market as indicated by Sir W. Crookes? If so, we may expect some startling developments. The herd of patentees who have been busying themselves with the production by electric furnaces of calcium carbide, will fall on the nitrogen flame; and there will be a fresh crop of "syndicates." Sulphate of ammonia, of course, will become a mere drug.

One of the few papers read at the British Association meeting which come into the category of the matters usually dealt with in the "JOURNAL" was that on "Municipalities as Traders," read by Mr. Councillor Pearson, of Bristol, before the Economical and Statistical Section. The author opened his subject very pleasantly by referring to the period when it could be said with truth that "if each man swept his own doorstep, the village would be clean." The world has moved a long way since then; and the community has now to do many things which the individual cannot by reason of his circumstances do for himself. Among other services, Mr. Pearson thinks the local authority ought to supply electric light; but only at a profit. He holds that all municipal trading should be at a profit, subject only to the condition that the profit is not made out of trading at a higher price than would be charged by a company. Apparently Mr. Pearson had no suspicion of the extent of the debatable ground left open by this qualification. With regard to the municipal supply of electric light, however, there is the disturbing factor that this service is admittedly a luxury for the few. Whatever may be the "pious opinion" of Mr. W. H. Preece as to the electric light being properly the poor man's light, this is not the case in Bristol, where the electricity supply works are of his devising. Mr. Pearson states that Bristol has 60,000 ratepayers, and under 1000 users of the electric light. "The luxury of private lighting to the few is rendered possible by pledging the credit of the many; and why should not the many reap some benefit from the risk they run, to say nothing of the actual loss which attended the early years of our undertaking, which was paid out of the rates levied upon them. I think," he went on to observe, "that Parliament will be wise not to put such restrictions as to profit-making as are shadowed forth by the report of the Telephone Committee. They may well leave the question of the amount of the profit to be settled by the natural law of supply and demand. The moment a municipality charges more for an article than it is worth will be the moment the public will refuse it." It is easy to argue that Mr. Pearson is altogether mistaken in his view of the whole duty of a municipal trader being to make a profit. Obviously, something else besides the consideration of whether a business is profitable has to be considered in determining the question whether it should be municipalized or not. This something is usually designated by the parliamentary word "expediency," which has to be proved before a municipal project receives legislative sanction.

In the special case of electric lighting, as with tramway construction, the general expediency of the supply of electric lighting being undertaken by the local authority is granted. But this is not on the ground that a local authority can depend upon making a profit out of electric lighting, but on the broader ground that a modern town community deserves to have this service, and that on the whole the local authority can expect to supply it to the best advantage. The general interest of Bristol is the master consideration in determining the question of the expediency of the municipal supply of electric lighting—not the comparatively paltry profit to be made out of supplying electricity to 1000 consumers among 60,000 ratepayers. Bristol is just getting the weather-side of its electric light business; but the undertaking is only just paying its way, after all, and depreciation is not yet fully provided for. As a modern city, however, Bristol would be behind the age if it had not an electric lighting undertaking; and which is the greater benefit to the city—a good and cheap electricity supply, or a thousand pounds or so a year of "profit" squeezed out of the city's customers for the benefit of some spending department of the Corporation, in the imaginary interest of the ratepayers, every one of whom gets one-sixty-thousandth share of it?

An Improved Incandescent Gas-Bulb.—Messrs. Falk, Stadelmann, and Co., of Farringdon Road, E.C., are introducing an improvement in the "Jena" incandescent gas-bulb, to which specialists who have made tests at Jena, under varying circumstances, ascribe an average increase of 50 per cent. of light over an ordinary chimney used on the "C" incandescent gas-burner. The improvement consists in the air current which ordinarily ascends through the burner and gallery being diverted, and drawn through holes pierced in the lower part of the bulb on a level with the burner. It is claimed—and the claim is supported by a comparison of the light afforded by a burner fitted with the new bulb and one fitted with an ordinary chimney—that by the lateral air supply thus obtained, the intensity of the flame is raised, and the luminosity of the mantle consequently increased. The method adopted to prevent the inflow of air through the burner is by closing the annular space by a small brass cone, which is placed in position by passing it over the burner head, and pushing it down as far as it will go. The protection of the mantle from dust and excessive draughts is another point in favour of these bulbs. Like the original form, the new one may be fitted with the fancy glass screens supplied by the firm.

WELSBACH'S ELECTRIC LAMP.

RUMOURS concerning the electric lamp invented by Dr. Auer von Welsbach have been rife since the beginning of the present year; and much nonsense about it has appeared in the columns of non-technical and some sections of the technical press. The fact that a certain mixture of two rare earths under the influence of the phenomena which attend the combination of combustible gases with the oxygen of the atmosphere radiates a greater proportion of luminous rays than do other substances under like conditions, led many to the rash conclusion that the same mixture would show a like superiority in the emission of luminous rays when applied under the totally different set of conditions which obtain in the filament of an electric glow lamp. The presence of air in the one case and the absence of it in the other, the occurrence of an intensely vigorous chemical reaction in the one case and an absolute dearth of chemical changes in the other, and the effects of the thermal conductivity of the material in the one case, and of its electrical conductivity in the other, are but a few of the important considerations which were overlooked by those who assumed *à priori* that, because the Welsbach mixture made a good mantle for gas lighting by incandescence, it would also make a superior filament for electric lighting. There seems no real ground for supposing that Dr. Auer von Welsbach ever favoured assumptions of this nature. No sooner, however, was it announced that he had invented an electric lamp, than little minds drew the conclusion that, because he had found a mixture of two earths a suitable material for gas-light mantles, his new invention must necessarily be the application of the same mixture in the production of electric lamp filaments. In order to denote quite unmistakably the supposed similar nature of the two inventions, many writers spoke of the lamp filament as a mantle, and thus spread the idea that the filament not only consisted of like materials, but had the same form as the Welsbach gas mantle.

From the outset, we protested against the assumptions made in these premature announcements. So long ago as Feb. 22 last—some weeks before the patent specifications were published—we ventured (see p. 397) to predict that the Welsbach mixture of thoria and ceria could not render the same signal service to electric lighting that it has afforded to gas lighting. We then said: "The catalytic action of ceria can avail nothing if the phenomena of combustion are absent, as they are in the electric light;" and as there was good ground for believing that the inherent economy of incandescent gas lighting was due to the catalytic action of ceria in the mantle, we expressed doubt whether the Welsbach mixture of earths could be of special utility to the electrician. The publication of the Austrian patent specification, of which we gave an abstract on April 19 (see p. 879), showed that our predictions were justified; for throughout the claims made by Welsbach there is no mention of ceria or of the Welsbach mantle mixture. Thoria, indeed, is mentioned; but, as we have already pointed out, thoria, *minus* a small quantity of ceria, is of no value as a material for incandescent gas mantles. A mantle of magnesia answers as well as one of thoria; and light cannot be economically obtained by heating either of these in an atmospheric gas-flame. The addition of ceria to the thoria effects a marvellous economy in the production of light from flame, but has no effect on the amount of light emitted when the mantle or material is raised to the temperature of incandescence by means of an electric current. Consequently, the economical advantage of the Welsbach mantle cannot be utilized by electricians; and Welsbach himself appears to have tacitly admitted this fact.

When writing in April last of the Welsbach electric lamp, we said that the materials of the new filaments were extremely costly; and that the manufacture of the lamps must of necessity be very difficult. With a certain amount of diffidence, we then made the remark: "We may perhaps find that Dr. Welsbach has presented the electrical world merely with a luxurious, but extremely expensive, method of illumination by electricity." The remark appears to have been singularly appropriate. We hear less, day by day, as to the revolution in electric lighting which the Welsbach lamp is destined to produce; while even electrical contemporaries hint that the manufacture of the filaments will be difficult, and that the materials are costly.

These views find confirmation in an article, to which are appended the initials of Dr. Wm. H. Wahl, in the "Journal of the Franklin Institute." Dr. Wahl lays special stress on the manufacturing difficulties. Filaments of osmium cannot readily be prepared, because that metal is infusible. The property of infusibility which makes it specially valuable as a material for the filaments, all but precludes their manufacture. The deposition of osmium on a thin platinum wire, by the reduction of the vapour of osmium tetroxide in a reducing atmosphere, is apt to give an uneven deposit; and the process seems to be a very slow and delicate one. An alternative method of obtaining a film of osmium on the platinum wire consists in drawing the wire repeatedly through a solution of an osmium salt, and igniting the wire in a vacuum after contact with the solution. The operation must be repeated at least a hundred times in order to produce a sufficiently thick and uniform deposit of osmium! A more practicable method consists in the impregnation with an osmium salt of vegetable or animal fibre, which is

subsequently ignited. But Dr. Wahl objects also to this method, on the ground that it will yield a filament of osmium and carbon in place of a pure osmium filament, and that the objections to the ordinary carbon filament will apply with equal force to one of carbon mixed with osmium.

The thoria filaments are produced by drawing a very thin platinum wire through a solution of a thorium salt, and then igniting the wire. This operation is repeated many times. It is said that the platinum core of the resulting filament may be melted, and the crust of thoria will remain unaffected. In ordinary use, however, the core will not be melted, but the heat will be transferred from it to the crust, which will thus become incandescent. In all cases, it is a question of producing a very high temperature by the passage of the current, and using materials such as osmium and thoria, which are sufficiently refractory and infusible to withstand the temperature.

Is there anything of practical value in Dr. Welsbach's electric lamp patents? Dr. Wahl, who is one of the foremost American scientists, appears to think there is not. He says: "In view of the great expectations raised by the reports of his (Welsbach's) remarkable laboratory work, it must be confessed that the outcome is a disappointment. While the methods proposed are ingenious, they seem to be altogether too delicate to be capable of being commercially applied; and they are undoubtedly so costly as to place serious competition with the cheap electric glow lamp, with which we are familiar, out of the question." We should not care to confess to unqualified concurrence with this opinion; for the Welsbach gas mantle some years ago seemed equally difficult of production and costly. Dr. Welsbach may yet achieve a triumph in the electrical world; but the time of its practical consummation appears to be remote. And even if the manufacturing difficulties and the high cost of the materials are not insuperable obstacles, and the Welsbach glow lamps are sold at the price of Welsbach gas mantles, the gas industry has little to fear from the competition. The action of the particles of ceria of the mantle *in a flame* gives gas a great initial advantage over the electric current in the transformation of heat energy into light. This is the simple inference from the results of the latest researches on the incandescent gas mantle.

THE REPORT OF THE PETROLEUM COMMITTEE.

Concluding Notice.

Our last notice of this report broke off at the point where the advocates of high-flash oil were met by the flat assertion of other parties to the inquiry that this particular property of a burning oil has no connection with its safety in use. The leader on this side was Dr. Dvorkovitz, well known to English gas engineers for his investigations into the gasification of oils. He laid before the Committee tables containing results of experiments showing that the safety of oil depends, not on the flash-point, but on the chemical constituents, on the quantity of light oil in the various kinds of petroleum, and on their heating properties. He also showed that, while the temperature of American oil of 73° flash-point increases slowly, that of Russian oil of 85° test increases more rapidly; and that Scotch oil heats up very quickly until it reaches a very high temperature. The conclusion drawn from these observations is that, with the relative flash-points of 73°, 85°, and 100° of the three different kinds of oils, the measure of safety is about equal. Mr. Berchten, engineer and chemist, supports this testimony, which is also in agreement with the finding of a Home Office report of 1890, by Sir Frederick Abel and Mr. Boverton Redwood. This was to the effect that where a high-flash oil develops more heat in burning than a low-flash oil, the former may be even more dangerous than the latter. Sir F. Abel maintained this contention before the Committee, arguing that the utility of a flash-point test was restricted to the purposes of storage, transport, and handling. It was considered by the Committee impracticable to have one flash-point for stored oil and another for oil to be burnt in lamps. They agreed that the stringent restrictions applied to petroleum spirit, if applied to petroleum under 100° test, would have the effect of preventing the use of such petroleum for domestic purposes.

The next question that arose was as to the probable effect on the price of lamp oil of raising the flash-point to 100°. As the report puts it, "Would the alteration of the dividing line between petroleum spirit and petroleum oil from 73° to 100° Abel close test cause a material rise in the price of petroleum for domestic purposes?" The inclusion of trade purposes in the question would render it more comprehensive. The answer is highly doubtful. The Committee were unable to obtain convincing evidence on this head, in any sense. They admit that the question is complex, and insusceptible of precise solution, because it involves the consideration and weighing of elements which lie almost wholly within the region of speculation. It is registered as an undeniable fact that the difference in price at present between the ordinary oil of 73° test and that of 100° test is from 2d. to 4d. per gallon. It would be a serious thing to put this increase of cost upon all lamp oil, merely to satisfy an opinion that oil of the higher flash would be somewhat safer than that in common use. When the Committee endeavoured to obtain conclusive testimony as to what would happen if 73° test oil were shut out from the market, they were only bombarded with opinions and arguments, mostly of an interested character. The Scotch oil men vowed there would be no advance of price. Other refiners declared that the effect of legislation in this sense would be to largely decrease the total yield from the present supply of crude petroleum; and it was more than hinted that one result would be to encourage the "doctoring" of burning oil so as to get a poor illuminating but high-flash mixture upon the market.

At present, 78½ per cent. of the total petroleum oil supply of the United Kingdom is below 100° test; and the Committee could not bring themselves to declare that the shutting out of so large a supply, amounting to upwards of 100 million gallons yearly, would have no effect upon the market price of what might get in at a higher test. One of the stock "arguments" that has been used to prejudice public opinion regarding this part of the subject, is the assertion that this country is made the "dumping ground" of the low-flash oil produced by the Standard Oil Company, which would not be permitted to be sold or used anywhere else. An example of argument on this line is to be found in an article in the "Contemporary Review" for August, bearing the suggestive title "The Defeat of the Oil Kings." The writer refers, of course, to the recommendation of the Committee to raise the flash-point to 100°; and he pretends to show "how convenient an outlet this country has proved for the most dangerous kind of oil, which cannot find a ready market in America." The name of this impartial witness is Robert Donald. Against him may be set the deliberate statement of the Committee that, after having "taken a large amount of evidence as to the statements so frequently repeated that this country is made the sole market for oil of such a dangerous character as would not be allowed to be used in the United States or elsewhere," they came "to the conclusion that the statement is unfounded." In fifteen or sixteen States of the American Union "there is no law on the subject at all. . . . In Holland, Belgium, Norway, Sweden, and Italy, 70° to 72° Abel test is found to be in use; while in Germany the legal flash-point is 70° Abel, or 3° lower than in this country. . . . Throughout India the legal flash-point is from 70° to 72° Abel." This positive evidence should demolish the specious contentions of writers like Mr. Donald; but naturally it will do nothing of the kind.

It is time, however, to pass from the consideration of the oil to that of the lamp. Professor Dewar told the Committee that the number of lamp accidents is exceedingly small in proportion to the enormous quantity of lamps in nightly use. Professor Sir Charles Cameron, of Dublin, declared that there are no more accidents attending the use of lamps than there would be in the case of candles. The Committee collected abundant evidence respecting the careless way in which lamp accidents are classified as "explosions," when they are nothing of the kind. The report runs over the tale of lamp accidents, and formulates four conclusions from it. These are to the effect that lamp accidents have not increased in number out of proportion to the vast increase in the number of lamps in use; and that, owing to the volatile nature of petroleum, reasonable care must be exercised in its use, whether the flash-point is 73° or 100°. Complete immunity from accidents is not to be expected with oil at a flash-point of under 120°—which is out of the question, on account of its probable price to the consumer. Consequently, the Committee do not see their way to recommend legislation of this kind. (It is scarcely possible to regard this finding as a victory for the high-flash party.) They do, however, recommend that something should be done to render lamps reasonably safe. They find among the witnesses examined practical agreement upon what should be observed and what avoided in the manufacture of lamps. These principles are few and simple. A familiar "fad"—the abolition of glass reservoirs—disappears, and is replaced by the sensible suggestion that such reservoirs should be made of sufficient strength. The standardizing of wicks and burners is also recommended; and it is advised that steps should be taken to instruct the public in the use and management of petroleum lamps. It is proposed that school children should be instructed "on a subject so vitally affecting the comfort and safety of their homes." The same idea received support at the recent International Chemical Congress.

The report concludes with an account of the proceedings of the Committee; and gives the original draft report prepared by the Chairman (Mr. Jesse Collings), and also that prepared by Mr. Ure. The latter was rejected; but the Committee agreed to read the Chairman's report paragraph by paragraph. The crucial division occurred upon paragraph 73, which proposed to retain the flash-point of 73° as the dividing line between petroleum oil and spirit. Mr. Ure proposed to substitute 100° for 73°; and the amendment was carried by a vote of 8 to 6—the Chairman not voting. Had he done so (as Mr. Ure did), the Committee would have been equally divided; and the Chairman could have carried his point by his casting vote. He did this upon a further amendment by Mr. Ure, explaining why the figure of 100° was adopted for the new flash-point. This amendment professed reliance upon a certain "view" of the subject expressed by Mr. Steuart, which was apparently more than the Chairman could stand. A more independent statement of similar effect, moved by Mr. Compton Rickett, was only rejected by a vote of 6 to 5. Finally, the amended report was

saved for the House by a vote of 5 to 4—less than an absolute majority of the Committee.

It is history that when the report was presented, the Chairman wrote a letter to "The Times" exposing the capture of the Committee by the trade interest. Immediately following upon this event, Mr. Ure and other champions of the high-flash idea brought in a Bill to raise the flash-point to 100° Abel close test; and Dr. Attwood began writing to "The Times" to persuade the public that this was what Parliament meant all along; although curiously enough he agreed in 1870 that the Abel close test of 73° was equivalent to the defective open test of 100°. Meanwhile, nobody has done anything towards clearing up the only question in which users of lamps and the gas industry are really interested—that is to say, what would be the actual effect upon the trade in artificial light of keeping all lamp oils under 100° Abel close test out of the market. The Scottish oil interest have said their last word upon this subject; and no further enlightenment is to be expected from this quarter. But inasmuch as Scotland supplied only one-seventh of the total quantity of oil provided for use in the United Kingdom in 1895, it is not to be assumed that every other interest is to be governed by Scotch "views" of the needs of the trade or the requirements of consumers. There is at the present time an importation of cheap American burning oil amounting to about 150 million gallons per annum. Why does not some independent expert tell us what might be the expected effect of treating the crude oil from which this kerosene is obtained, so that only 100° flash oil should be obtained in its place? It was given in evidence that the simple withdrawal of more naphtha would not effect the desired purpose without the concurrent removal of some of the heavier components of the natural product. Would this operation have the combined result of raising the cost of lamp oil and setting free a larger quantity of heavy residual oils suitable for gas making? If so, it would not be the gas industry that would have most cause to complain.

Next year Parliament will be expected to take action upon the report of the Committee, such as it is; and it can hardly be imagined that legislation will be seriously influenced by review and newspaper articles, representing little else than the play of trade interests upon ignorant susceptibilities. Our contemporary the "Engineer," in its issue for July 29, ruthlessly exposed the hollowness and selfishness of the case for the protection of the Scotch shale oil industry. We cannot add to the completeness of this exposure, and are not solicitous to repeat the riotous terms in which it is expressed. The only subject worth the notice of serious people who are dealers in oil to any extent is the probable consequences of giving statutory effect to the recommendation to increase the flash-point of burning oil; and this, as already observed, is precisely the question which nobody has attempted to answer. Time is slipping away; and unless the desired information should be forthcoming mischief may be done. Meanwhile, advocates of the popularization of gas for lighting and heating in the dwellings of the poor may be recommended to make legitimate use of the uncertainty in which the Committee have left the question of the safety of petroleum lamps and stoves to persuade the public as to the superior advantages of gas for both applications. Whether the blame is due to the oil or to the lamp, lamp accidents have increased, are increasing, and ought to be prevented; and the only reliable way to escape such occurrences is to do away with lamps altogether—a consummation which the prepayment gas-meter has placed within the reach of the humblest householder.

OBITUARY.

Mr. JOSIAH GASKELL, J.P., the Chairman of the Gas and Water Committees of the Ashton-in-Makerfield District Council, died recently, at the comparatively early age of 56.

Mr. ROBERT WATT, the Secretary of the Airdrie Gaslight Company, died on the 1st inst., in the 86th year of his age. Mr. Watt held a number of public appointments, among others that of honorary Sheriff-Substitute for the County of Lanark, and Clerk to the Justices of the Peace for the Airdrie district—the latter for about half a century.

Alderman JOHN ASHLEY RANDELL, who has lately died at Devizes, was very largely responsible for the development of the gas and water works of the town, both of which are Corporation property. His energy was more particularly directed to the water-works. From their inception until illness incapacitated him a few months ago, Alderman Randell had practically made himself responsible to the Council for their efficient working. This was no light matter, as quite recently the partial failure of the pumps threatened the possibility of a cessation in the supply; and the work of rectification involved much anxiety and labour on his part.

It is with regret we have to announce the death, on Tuesday last, of Mr. AMBROSE WARDE, late Chairman of the Maidstone Gas Company. Mr. Warde's connection with the concern as a Director had been a long one; and for upwards of 32 years he presided over its interests with conspicuous ability. In consequence, however, of continued ill-health, he was compelled recently to relinquish the office, much to the sorrow of his colleagues, who, in announcing his retirement in their report to the shareholders in August, acknowledged how much he had done towards raising the undertaking to its present satisfactory position. Many members of the Southern District Association of Gas Engineers and Managers will recollect the kindly welcome extended to them by Mr. Warde when, in May, 1894, they visited their then President (Mr. H. Smythe), the Engineer and Manager of the Company. With what pride Mr. Warde referred to the prosperous condition of the Company, will still be fresh in their memories. In the previous five years, he told them, the price of gas had been 2s. 5d. per 1000 cubic feet; and it was his boast that the history of the Company did not contain an example of a rise in price. Few chairmen of gas companies could say thus much as evidence of good government. The funeral of the deceased gentleman took place on Saturday at West Farleigh.

PERSONAL.

From an advertisement appearing in another column to-day, it will be gathered that Mr. A. W. MARKS is vacating his position as Secretary of the Sheppy Gas Company. He intends retiring at the end of this year, we learn with regret, mainly through failing health.

Dr. MICHAEL FOSTER is the President-elect for next year's meeting of the British Association, which will be held at Dover. Professor RUCKER has just been appointed a Trustee of the Association in place of the late Lord Playfair; and the General Treasurership which has been vacated by Professor Rücker has been confided to Professor G. CAREY FOSTER.

The proceedings at the meeting of the Alliance and Dublin Consumers' Gas Company on the 30th inst. will be of more than ordinary interest; for the shareholders will be asked to bestow upon Mr. W. F. COTTON, the Manager and Secretary, that reward which his devotion to the service of the Company fully entitles him to. Mr. Cotton will tender his resignation, and a proposition will be made that he be granted a retiring allowance. It is not intended, however, that the Company shall lose the benefit of his long experience and splendid business talents. A vacancy exists on the Board; and it is proposed that Mr. Cotton shall take the position, with the title of Managing-Director. Mr. F. T. COTTON, jun., who is at the present time Assistant Secretary and Manager, is to be promoted to the secretaryship. These changes will, it is certain, be readily approved by the shareholders.

Harcourt's Ten-Candle Lamp Standard.—At the recent British Association meeting, Mr. A. G. Vernon Harcourt exhibited and described his ten-candle lamp to be used as a standard of light. The paper was mainly on the lines of that read by Mr. Harcourt at the May meeting of the Institution of Gas Engineers. The same author in another paper, "On a Convenient Form of Drying-Tube," exhibited and explained an apparatus to be used for drying gas, and said to have many advantages over the usual appliances.

The Patent Rights in "Induced Current" Incandescent Burners.—In their number for the 12th inst., "Progressive Age" (New York) mentions that they have received the following expression of opinion from Mr. C. Knox Harding, of Chicago, which may be of interest in relation to a recent discussion in the "JOURNAL." He says: "Writing of the respective merit and priority of invention of the Bandsept and the Kern burners, the respective dates of the English patents (Bandsept's, Sept. 25, 1895, and Kern's, Jan. 5, 1897) can hardly be near the actual time when such inventions were first produced; and the mention of the English patent to Rudolf Langhans of June 14, 1895 [See "JOURNAL," Vol. LXVIII., p. 74] carries the date less than four months back. Now, the Langhans injector is essentially like the Kern, neither of which is as good as the Bandsept, in which the duplication of the conical frustra increases the injector action and aids the primary mixing. On the other hand, Kern has the best atomizer. Though Bandsept talks a great deal about it, his actual devices offer too much resistance to the upward flow of the mixed air and gas. The Langhans does not show any atomizer, but is based on a theory now known to be wrong—of admitting unmixed air to the centre of the flame. Practically all the gas which is burned except in the immediate zone of the mantle is wasted; although the calcium, zirconium, and common earth mantles largely used by Langhans—in which he uses gallium, indium chrome, and vanadium 'peroxidizers'—are known to the writer to require somewhat different burner arrangements. But an intelligent consideration of the priority of the idea by anyone familiar with the art, could not leave out of account several inventions of very much earlier date. The atmospheric burner, invented by James Lewis, and patented in England more than 14 years ago—viz., January, 1883 (No. 105), seems to be a very general anticipation of almost all that has since followed. He has a most perfect form of compound injectors and mixing cones like the Bandsept and Kern; and, like them, he also tries to patent not only the apparatus but the result. His second claim reads: 'I claim the use and application of gas under pressure to produce an induced current or currents of atmospheric air to mix automatically with the gas in its passage to an incandescent gas-burner.'".

NOTES.

A New Preservative Silicate Paint.

Messrs. Lee and Lawtons, of New York, have patented a preservative paint intended to offer greater resistance to rain, frost, and sun than ordinary linseed oil paints, which, as already explained on several occasions in this column, are naturally and incurably hygrometric. By this new process, a water colour paint is produced which becomes insoluble upon drying. Two compositions are required. In the first is some base consisting of a compound of lead, zinc, barium, or other element which is almost insoluble, but will become perfectly so by reaction with an alkaline silicate. Two mixtures are accordingly made, one of them containing the pigment, if any. This is diluted with water to the proper consistency, and is laid on first by the brush or with a spray and allowed to dry. Then the other mixture is applied, with the result that various complex treble or quadruple silicates are formed in the coating, which becomes insoluble and impervious to moisture. If a thick coating is desired, the first mixture is not diluted so much, and the coats are applied in a different order. The effect is the same in either case; and any desired body or tint of this paint can be prepared for use upon structural ironwork or cement.

The Source of the Illuminating Value of Gas Oils.

Herr Eisenlohr has been investigating the reasons for the occasionally unsatisfactory gasification of mixed petroleum oils. It had been suggested that every component of a gas oil requires special conditions for its proper gasification. In order to test this assumption, experiments were made with brown coal-tar oils containing paraffin; the illuminating values being calculated by the aid of Helfer's formula. In the first series, oils boiling below 360° C. were chosen; and here it was found that the illuminating power increases concurrently with the percentage of (soft) paraffin present. Similar results were obtained from other oils with varying boiling-points below the prescribed limits, without there being any necessity for altering the temperature of gasification—paraffin, though difficult to gasify when alone, being readily so if dissolved in oil. It was also found that mixed oils, boiling-point below 360° C., gave upon gasification illuminating values corresponding to the mean of those yielded by the various components of the mixtures; the difference between their temperature of gasification being in no case sufficient to influence the result. With oils boiling above 370° C., the illuminating power did not correspond with their paraffin-content. The deficiency was ascertained not to be due to the employment of acid in refining, but to the presence of some high-molecular unsaturated compounds. These were removed by shaking the oil with sulphuric acid, when the illuminating value rose 2½ points. As this result was confirmed in the case of other similar oils, the unsaturated compounds present in the higher fractions are thus revealed as the cause of the unsatisfactory behaviour on gasification of mixtures of light and heavy oils.

The Use of Spirit for Illuminating Purposes.

The German manufacturers of spirit from potatoes, &c., have been endeavouring for some years to find an outlet for spirit for illuminating purposes. The development of the Welsbach system of lighting by incandescence afforded hopes that spirit might be used with Welsbach mantles on an extensive scale. The German Spirit Manufacturers' Association undertook a number of researches for the purpose of investigating the cost of illumination by means of spirit; and a report has now been issued in the "Zeitschrift für Spiritus-Industrie." Briefly, the conclusion drawn from the results of the researches is that spirit can barely compete with petroleum at the prevailing low prices of that material. There are, however, several points in the report of special interest to gas managers. Records of trials of spirit as a diluent of many rich hydrocarbons derived from gas-works are given. In particular, a mixture of benzene with spirit of 96 per cent. strength, when consumed in an ordinary small paraffin-oil lamp, was found to give a flame equal in illuminating power to that of petroleum. The most suitable proportions for the mixture were 1 part by weight of benzene to 2 parts by weight of spirit. Weaker spirit, when mixed with benzene, did not give so satisfactory results. But 100 parts of petroleum have, practically, the same illuminating value as 162 parts of the mixture of benzene and spirit; and even if it is granted that benzene will be as cheap as denatured spirit so soon as the coke-oven benzol-recovery plants now in course of erection are in full operation, the mixture could not compete with petroleum for consumption in ordinary lamps. Solutions of naphthalene in spirit afforded a highly luminous flame; but the burner needed modification in order to prevent it smoking. When the lamp was extinguished, naphthalene crystallized out in and around the wick, and burnt with a very smoky flame when the lamp was again lighted. Mixtures of xylene and spirit did not answer so well as the benzene and spirit mixture. In incandescent lamps, however, mixtures of xylene and spirit proved more economical than simple spirit. Thus 73·2 parts of a mixture containing 15 per cent. of xylene, and 81·4 parts of a mixture containing 10 per cent. of xylene, gave the same illuminating power as 100 parts of simple spirit when used with the same mantle.

TECHNICAL RECORD.

EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.

Half-Yearly Meeting at Romford.

The Twentieth General Meeting of the Association was held last Thursday at Romford, under the presidency of Mr. W. D. Child, the Engineer and Manager of the local Gas Company. It is a matter for regret that only a small proportion of the members attended; but their absence was counterbalanced by the presence of a number of visitors. The place of assemblage was the gas-works; and there the members received individually a cordial greeting from the Chairman of the Gas Company (Mr. Joseph Smith), his colleagues, and the President. The principal feature of interest on the works is the retort-house, which contains retort-settings heated by the regenerative furnaces which were described to the members in a paper read by Mr. Child in 1894. The construction of these was examined by the visitors, who were also enabled to witness the charging of the retorts by West's manual stoking machinery—the ease and rapidity with which two men performed the operation being freely remarked upon. Having completed their inspection, the visitors partook of luncheon, which had been courteously provided by the Directors; and afterwards they were conveyed by brakes to the District Council-Room, where the business part of the day's proceedings was at once commenced.

The President, on taking the chair, remarked that it was customary for the retiring President to introduce his successor; but he was sorry to say that Mr. J. T. Jolliffe, of Ipswich, who conducted the affairs of the Association so well during the time he was in office, was unable to be present through indisposition.

Confirmation of Minutes.

The Hon. Secretary and Treasurer (Mr. J. H. Troughton, of Newmarket) read the minutes of the meeting held at Peterborough in April last, and they were confirmed.

New Members.

The President proposed, and Mr. H. Wimhurst (Sleaford) seconded, the election as members of: Mr. Joseph Davis, of Gravesend, and Mr. Frank Clark, of Southend-on-Sea.

The President then delivered the following

INAUGURAL ADDRESS.

Gentlemen,—When I call to mind the few years that I have been connected with the Eastern Counties Association of Gas Managers, I fully appreciate the honour that you have done me in selecting me as your President; and I am at the same time impressed with the responsibility imposed upon me to maintain the work of the Association at the standard to which it has been brought by those who have preceded me in office.

I trust it will not be considered out of place if I take this opportunity of thanking the retiring President (Mr. J. T. Jolliffe) for the great interest he has taken in the affairs of the Association during his term of office, for the tact displayed in promoting discussions both interesting and valuable, and for the generally enjoyable character of the meetings. During the past few years, the members of the Association have received most cordial welcome at the towns they have visited—both from Municipal Authorities and from Directors of Companies; and this of itself is most gratifying, and may be taken as an indication that the efforts of the members to effect improvements in manufacture, and to extend the use of gas, are appreciated by those interested in gas undertakings.

At the meeting in Ipswich last autumn, the Chairman of the Gas Company (Mr. Biddell) spoke in terms of high commendation of the useful character of the work done by this and kindred Associations in maintaining the values of gas properties in the face of keen competition from other illuminants; and he said that this had been legitimately accomplished by the introduction of devices for reducing the cost of labour, and the quantity of material used in the production of gas, and by perfecting systems by which the consumers can obtain the highest value from the gas, whether used for lighting or for heating. Such remarks, coming from a gentleman whose life had been passed in the successful management of a large engineering business, are a great encouragement to these organizations to extend their researches and operations.

Some short time ago, a most interesting letter appeared in the "Gas World," advocating the formation of a Junior Gas Engineers' Association. It was at once pointed out how difficult it would be to carry on such a Society, owing to the manner in which gas engineering students are scattered over the length and breadth of the land; and I venture to express the opinion that the number of Gas Associations already in existence render any addition unnecessary. The fact of a student having successfully passed examinations, and obtained Honours from the City and Guilds of London Institute, should qualify him at once for admission to any of the District Gas Associations, and, under certain conditions, to The Gas Institute. Such a course would meet the views of the writer of the letter, by enabling students to attend the meetings of men having a more extended practical and theoretical professional knowledge than themselves, and to take part in their debates. The introduction of such young men,

whose ideas, full of the freshness and vigour of youth, had been directed into proper channels by an intelligent and well-regulated course of study, would be a great benefit. If they would take their part in the work of the Association by providing papers, or even introducing subjects for debate, and would let themselves go—not being content to be mere silent members—they would be distinctly welcome. They might, and probably would, make mistakes. But better that than do nothing; for the correction of such mistakes would prove a valuable education to themselves and their seniors, and if carried out in the kindly spirit and with the courtesy they might reasonably expect to receive, might prove the foundation of many friendships. If at times they experienced a little rough handling in the way of criticism, it would only be a slight foretaste of what they must be prepared to receive later in life when controlling works themselves.

While on this subject, it may be useful to remark upon what has to me always appeared an astonishing peculiarity—viz., that the selection of men to control works for the manufacture of gas (a distinctly chemical operation) should be made from a class who have made mechanics, rather than chemistry, their particular study. The duties of a manager of gas-works are varied, requiring an extended mechanical, as well as chemical and commercial training. But that the proposition I have laid down is correct is, I think, conclusively proved by the character of the papers and discussions at our meetings. Early training will assert itself; and the frequency of papers having a valuable technical engineering character, and the heartiness and thoroughness of debate upon them, can but be contrasted with the scarcity of papers having a distinctly chemical basis, and the hesitating, doubtful manner in which such purely chemical subjects are treated. The modern student, especially trained for the gas profession, has his attention directed as much to one branch of his profession as the other, and becomes a chemical engineer; and I therefore strongly advocate that the Gas Associations now in existence should give every facility for the admission of these young students, whose presence cannot fail to be of assistance and value to all concerned.

The members of this Association were, I am convinced, actuated by good fellowship toward myself, more than by expectation of seeing anything new or remarkable in the works under my charge, when they decided to visit Romford. The works, as you are aware, have only been built a few years—gas making having been commenced in September, 1892. It was an unfortunate thing for the Company that, after the establishment of the old works in 1847 on a site having an area of about one-third of an acre, residential property was gradually built in the neighbourhood, until, as business increased, it proved a great obstacle to enlargement of the works. Everything that was possible was done to put off the inevitable removal. The one-third of an acre ultimately contained all the buildings and plant for manufacture, purification, and storage, in addition to the Manager's residence and the Company's offices; and during the last winter that the works were in use, 170,000 cubic feet of gas were sent out daily, with storage capacity for only 53,000 cubic feet. I am thankful that some modern methods had not at that time been more fully developed, or it is possible that, with a water-gas plant, and purifiers roofed in with a gas-holder tank standing upon brick piers, I might even now be struggling in that cramped site, with unceasing anxiety to myself and discomfort and disadvantage to all concerned. At last it became a necessity to acquire other land, and to build entirely new works. For a small Company, the abandonment of works in running order was a great sacrifice, and likely to prove a heavy burden in the future. It was therefore imperative that no expenditure of capital should take place that was not expected to prove immediately productive; and it would be an injustice to my Directors and myself if I failed to assure you that the design and erection of the new works received most careful consideration, with the desire that on completion they should in all respects be equal to the requirements of both shareholders and consumers. The work that was carried out was all substantial, thoroughly good, and in no way stinted; but nothing was spent upon ornamentation, or in providing plant that was not required for immediate use, or that was not expected to effect saving in labour or material. The leading ideas were to secure and make use of railway communication for the delivery of all material; to adopt the best-known method of handling and carbonizing coal; and to provide plant for the effective purification of the gas, and as much storage as would enable every economy to be practised in manufacture, and furnish an unstinted supply of gas to the consumers of all kinds. The distributing plant was added to, and where requisite re-arranged; but so little was done in the principal thoroughfares that, when the works were nearing completion, I was several times asked when, and how, they would be connected to the existing supply. Having a considerable day consumption by gas stoves and engines, we give a minimum initial pressure of 15-10ths. Yet the unaccounted-for gas has been kept within fair limits. The past two years averaged 4·5 per cent.; and during the last half year, with 21 miles of mains for an output of 20 million cubic feet, the loss was only 3·29 per cent.

The retort-house (fully described in a paper I read at our Yarmouth meeting in 1894) contains settings of retorts heated by regenerative furnaces; the charging of the retorts is done by West's manual stoking-machines; and the hydraulic is fitted entirely with anti-dip valves. After some twenty years' continuous working, my belief in the advantages of the anti-dip system is fully confirmed. So far the arrangements are on modern lines. But on consideration of the varied plans I have seen for effecting condensation—foul mains of large diameter extended in long lines on the walls of the buildings, as far as their size would permit, and condensers, annular and otherwise, so powerful that two-thirds of their capacity had to be shut off—I determined to be more moderate.

The gas is taken by a pipe from each length of hydraulic main, and, crossing the bench, is connected to the foul main, which runs by the most direct route to the condenser—indeed, I may say that the whole of the plant was purposely arranged for the connections to be as short and simple as possible. Rather than run a long length of foul main of large diameter round the building—a method frequently practised—I preferred to spend a portion of the value upon a vertical tube fitted with perforated discs, and subject the gas to a process similar to what the late John Somerville termed "hot frictional condensation." After this the gas is condensed in an annular condenser before being passed through the exhauster. It is then washed with strong liquor in a Livesey washer, scrubbed, and finally washed with water in a Cockey's washer. The dry purification is performed with alternate layers of lime and oxide of iron; the boxes being worked on the rotary system.

Nothing was expended upon buildings to cover either purifiers or oxide of iron in course of revivification. If buildings are erected over purifiers, the work should be done thoroughly —*i.e.*, in such a way that control may be maintained over the temperature of the gas in course of purification. But when (as is most frequently the case) the purifier-house consists of a draughty building, a mere roof covering supported on columns or brick piers, the purifiers themselves being carried some height above the ground on iron girders, with all pipe connections underneath, exposed to cold, cutting draughts, then I would rather save that expenditure and bury my purifiers and pipes as deeply in the ground as possible, and so preserve an equable temperature, and also give support to the boxes, which are at times subjected to heavy strains.

As having some connection with this latter remark, and to show that the point must be taken into consideration, I may say that, during the early part of last winter, I was using some natural bog ore of rather inferior quality; and thinking to improve matters, I purchased some manufactured hydrated oxide of iron. This was mixed with old bog ore and sawdust—an equal bulk of each of the three ingredients—and charged into the purifier in two layers, each 18 inches thick, with a space 6 inches deep between the layers. This mixture absorbed the sulphur from the gas so rapidly as to considerably increase its bulk, with the result that the cast-iron sides of the box were unable to resist the strain, and the plates were broken from top to bottom on each of the four sides. I have nothing to say against the purifying material in question—indeed, I am still using it, but under different conditions. I do think, however, that the vendors were not as careful as they might have been in drafting the directions for use sent out with the material, as I find that my experience was not a solitary one.

Returning to the question of expenditure on purifying plant, I repeat that, having a certain sum to expend for the purpose, it will be found better to utilize it in purchasing the largest purifiers that can be had for the money, than to fritter away a portion of it on buildings that are of no practical good. A purifier-house designed, and sufficiently well constructed, to be of service in regulating temperature, will be found a costly addition; and unless great care is exercised when opening the boxes for the purpose of changing the material, it might easily prove dangerous. The works under my charge are capable of producing about 250,000 cubic feet of gas daily—perhaps slightly more; but I limit my estimate of the productive capacity to this amount because I am of opinion that when plant is worked beyond a fair limit, leaving no portion available for use in case of emergency, wasteful expenditure of labour and material at once begins. The gas-works that are always kept slightly in advance of maximum production can be carried on most economically, even though the capital may thereby be slightly increased. Some managers may experience difficulty in obtaining the sanction of their boards for every expenditure on plant which may not only appear advisable, but which their daily experience tells them is absolutely requisite. The manager may even be reminded that the winter season is passing away, and that troubles caused by some insufficiency of plant will soon be over. But it must not be overlooked that in this country many works manufacture as much gas in the four winter months as in the remaining eight, and that if half the work of the company is carried on in the busy season of the year under adverse conditions, with consequent waste, it cannot be made up by successful working during the period when the plant is capable of dealing properly with the quantity of gas required. Through circumstances beyond the control of my Board, I had ample experience of the difficulties of working with insufficient plant; but I am happy to be able to say that this condition of affairs has passed away. The difficulty experienced during the past two years in finding a ready market for coke, at times made me wish that we were not quite so well provided for, and that I had sufficient cause to justify putting down some plant of another description. The design of these works was such that extensions would be so in reality, and would not necessitate altering or disturbing

work already executed; and nothing beyond the manufacture of coal gas was contemplated.

During the past few years, great progress has been made in this country with the erection and working of plant for making carburetted water gas. The process, worked in conjunction with coal gas manufacture, appears to possess so many advantages that I shall be very pleased when the growth of this Company's business necessitates further additions to plant, and, regardless of the objections that have been raised in some quarters, I shall advocate the adoption of this system of manufacture. I have no doubt before that time arrives the Home Office Committee will have fully considered the allegations that have been made as to the dangerous character of water gas, on the ground of its containing a larger percentage of carbon monoxide than is found in coal gas, and will have determined what restrictions (if any) shall be placed upon the use of carburetted water gas, and the proportions in which it may be combined with coal gas and supplied with safety and advantage to the public. The President of The Gas Institute (Mr. James Stelfox), in his address at Belfast, dealt at considerable length with this phase of the subject; and I think he conclusively showed that the objections raised were more fanciful than real. During the fifty or more years that coal gas has been in common use, the public have learned that it is both disagreeable and dangerous when allowed to escape into their houses; and they therefore take proper precautions to prevent such occurrences. If the compound gas is more dangerous, it is equally disagreeable, and will make its presence known as quickly; and it is therefore likely to receive the same amount of attention that has sufficed for the protection of the users of ordinary coal gas. The advantages of the carburetted water gas system may be summarized as follows:—

1.—The small amount of capital required for any stated production (say) beyond 150,000 cubic feet per diem, compared with coal gas.
2.—The small space occupied by the plant, thereby reducing the cost of buildings; and its simplicity of construction, resulting in low cost of maintenance.
3.—The control given by the use of the plant over the production and sale of coke.
4.—The fact that enlargements of carbonizing plant do not necessitate a relative increase of coal storage, but may enable deliveries of coals to be more equal through all seasons of the year.
5.—The readiness with which any accidental lowering of illuminating value in the gas may be corrected, and the steadiness with which the gas may be maintained at any desired standard.
6.—If gasholder capacity is insufficient for the consumption, then the water-gas system, with its rapid production, may be brought into use during hours of maximum consumption, to assist in keeping the holders full and the supply to the consumers properly maintained.
7.—If there is ample storage capacity, then a smaller number of retorts may be kept in action than would otherwise be required—especially during the summer months; and as the gas stock runs down, and becomes reduced as low as may be considered a safe limit, the water-gas plant can at once be put to work, the gasholders be filled up in a short space of time, and the use of the plant then as readily be discontinued until again required. This method of working could be carried on with safety. Indeed one member of this Association who has experience in working the plant assures me that, starting all cold, the apparatus may be prepared and making gas within four hours.
8.—The valuable qualities carburetted water gas possesses for clearing away naphthalene obstructions, either from works plant and connections or from mains and services.
9.—The greater feeling of security on the labour question, as the number of men required is much smaller, particularly in using plant of large productive capacity; and the class of men employed, being rather superior in training and intelligence to the ordinary stoker, are more subject to control. I have read remarks from some gentlemen deprecating the introduction of a system that would have a tendency to decrease the number of men employed; but personally I have no feeling of sentiment on this score. In this locality, at all events, work is so plentiful that difficulty arises in finding suitable men; and no honest, industrious man need be without employment.

With regard to coke, the value usually appears to be quite local in character, and to decrease as the quantity in stock at the works increases. The sight of a large heap of coke in the yard makes a would-be purchaser utterly indifferent about buying, unless at a ridiculously low figure; and I think that, when stock grows beyond a certain limit, it is wiser to cut the loss by one quick sale at a low price than to attempt to stock the coke in hopes of a better market. During the past two winters, our works became so overstocked with coke that, though possessed of plenty of carbonizing plant for the production of coal gas, I seriously contemplated recommending to my Board the erection of water-gas plant with the object of reducing the output of coke and turning the stock we had in the yard to better advantage than by selling at the low price we were compelled to accept.

My idea was to put down plant equal to a production of 200,000 cubic feet per 24 hours, and to work it from 8 to 12 hours daily, and so produce about 80,000 cubic feet of water gas. A daily make of 200,000 cubic feet of coal gas would require the carbonization of about 18 to 19 tons of coal, producing (say) 13 tons of coke, of which about 10 tons would be sent into the yard for sale. These figures are only approximate. Now, if 80,000 cubic feet of carburetted water gas were made, leaving only 120,000 cubic feet of coal gas, the result would be that only 11 tons of coal would be used, producing from 7 to 8 tons of coke, of which 5 tons would be available for stock. But this quantity would be further reduced by the 32 cwt. required for the water-gas plant, so that the quantity for daily sale would be only 3½ tons, instead of 10 tons as in the case of making all coal gas.

The plant required for an installation to manufacture 200,000 cubic feet of carburetted water gas in 24 hours would consist of a generator, superheater and fixing chamber, washer, oil-heater, seal pot, scrubber and condenser, relief-valves, automatic regulator, hot-air valves, and all necessary connections between the apparatus. An elevated iron operating floor and staircase, and a lift for raising the coke for the generator to the operating floor would also be required. The whole of this plant can be conveniently arranged on a floor-space of about 18 ft. by 35 ft.; and, if duplicated, the requisite area would be about 30 ft. by 35 ft. In addition to this, there would be one engine of 18 indicated horse power, with special gas-plant blower, an oil-pump and meter for measuring the oil used, a storage tank and tar-separator and tar-pump, and two boilers of about 30-horse power, which are also available for generating steam for the exhausting plant. The buildings, in the case of my own works, would have cost about £700; and the total cost of the installation so far would have been about £3500.

As the production of the gas is intermittent, and is at times very rapid, it is necessary to provide a relief holder, which receives the gas, and acts simply as a governor to keep steady pressure on the exhauster inlet, and allow the exhauster to be run at a constant speed. This relief holder, if erected specially for the purpose, should be equal to at least one hour's production of gas. Having exhausters and engines in duplicate, and purifiers of ample capacity, I could, with my present plant, have dealt with both descriptions of gas, which would have been mixed together at the outlet of the exhausters, and then passed along through the several stages of purification, and through the station meter to the gasholder.

I have already stated that the cost of the plant, as described, would be about £3500; and this amount represents as nearly as possible the value of a gasholder and tank of 120,000 cubic feet capacity, such as we have in use, and from which about 110,000 cubic feet could be taken to supply the consumers. As the carburetted water-gas plant will easily supply (say) 100,000 cubic feet of gas in twelve hours, and would in emergency supply 200,000 cubic feet per diem, it appears that a gas company of this size, with a growing consumption, may obtain more benefit by an expenditure of £4000 upon water-gas plant than upon storage. The makers of the plant say that 20-candle gas may be made at about the same price as 15-candle coal gas. As I did not require gas of more than 17-candle power, I made inquiries in various directions, and obtained statistics from which I prepared the following estimate:—

Cost per 1000 *cubic feet of making Carburetted Water Gas, continuous working, producing* 100,000 *cubic feet in twelve hours.*

Coke, used in generator and boiler, 48 lbs., at 12s. per ton	3·04d.
Oil, allowing ·15 gallon per candle power = 2·5 gallon, at 4d.	9·60
Water	0·50
Purification	0·50
Wear and tear	0·50
Labour, 1 man at 5s., 1 youth at 3s. 4d.	1·00
	15·14
Less residual oil	0·14
Cost per 1000 cubic feet for 17-candle gas in holder.	15·00

In this estimate, I have placed coke at a price that I should like to realize as an average, and oil also at a high figure per gallon. It is quite possible that the makers of this description of plant may consider that I have not done them justice in allowing such high prices for coke and oil, or in restricting myself to such a low-grade gas as 17-candles, and to so small a daily production as 100,000 cubic feet. But these were the particular requirements in my own case; and I therefore endeavoured to obtain figures that would be realized in practice. In producing gas of the quality named, and up to the stage of manufacture described, I could not put together figures that would show a saving of more than 1d. or 1½d. on the cost of coal gas; but there are other advantages not readily expressed in fractional parts of shillings or pence, that would assuredly result in the saving of pounds.

It would be a difficult matter to show by figures how the cost of producing coal gas was affected by the deficiency or otherwise of storage or gasholder capacity; yet every maker of gas knows that this is one of the principal factors in the case. And it is equally difficult to express in commercial terms all the advantages that may accrue from the judicious use of a carburetted water-gas plant, in conjunction with the ordinary

gas plant, although these advantages are in suitable cases perfectly apparent. In towns which are not adjacent to the coal-fields, the system described will prove of great service in cheapening the production of gas, and so benefit the consumer, and add to the stability of gas companies; and it is to be hoped that the Committee who are engaged in considering this subject will not impose restrictions that will retard the use of this particular gas when mixed with coal gas in reasonable proportion.

I think that the Directors and shareholders of this Company, as well as the gas consumers, have all cause for satisfaction with what has already been done, when it is remembered that since the opening of the works in 1892 three reductions have been made in the price charged for gas, amounting in all to 7d. per 1000 cubic feet. Compared with the price that was current five years ago, this means a saving to the users of gas in the Company's district of nearly £1200 per annum; and if the reductions already made result in a proportionate increase in the Company's business, I shall hope in time to see the price reduced to 3s. 4d. per 1000 cubic feet; and the saving to the town will then amount to not less than £2000 annually.

It may perhaps be thought that the foregoing remarks upon the past and prospective outlay upon the works in question are somewhat irrelevant, as addressed to a body of gas managers; but they serve to show that even a large expenditure of capital is justifiable, when made for purposes that will effect a continued saving in labour, and be productive of improved results in working. The increase of business that I have mentioned as desirable, may fairly be anticipated, for the decreased price multiplies the uses to which gas may be applied for domestic or trade purposes. Engines may be used for sawing wood, turning lathes, pumping water, cutting chaff or sausage meat, or even for driving a dynamo for the production of electric light. It is a matter of indifference to a gas maker whether the gas he produces is used directly for illumination or as the motive power for producing electric light.

As an indication of the increasing use of gas-engines, I may mention an instance that has recently come under my notice. A gentleman was telling me of some work he had in hand in connection with some extensive pumping arrangements for emptying a dock. The object in view was to put down plant that would pump the water out of the dock as quickly as possible, at a reasonable cost, and that would occupy but little space. I suggested the use of gas as the motive power in place of steam; and inquiries put to engineers who have made this class of work a speciality, resulted in the preparation and execution of the following scheme:—

Specification of Plant for Emptying a Dock 450 feet long, with a mean breadth of 65 feet, and 25 feet depth of water, containing a ship of 4000 tons displacement.

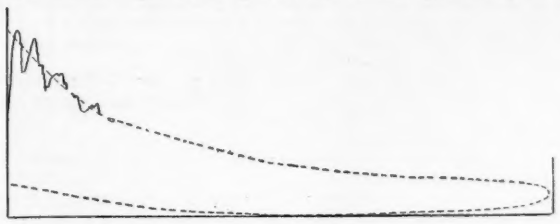
Scheme No. 1 provided for three 50-horse power nominal gas-engines, each coupled direct to a centrifugal pump for 26-inch suction and delivery, and fitted with disc 5 ft. 4 in. diameter, and mounted on mild steel shaft 7 inches diameter at smallest part. These pumps would empty the dock in 1½ hours, with a consumption of 8000 cubic feet of gas. Speed of engines, 120 to 160 revolutions per minute, to suit head of water. Leakage pump 7-inch centrifugal, driven by belt by 7-horse power nominal gas-engine. This was to deal with the water that would percolate through the dock gates, sluices, &c., after the main body of water was pumped out. Water-tank, 50 ft. by 8 ft. by 4 ft. 6 in., to hold 50 tons of water for cooling the cylinders of the engines.

Scheme No. 2 provided for the supply of two gas-engines, each 96 brake horse power, coupled to two centrifugal pumps with 26-inch suction and delivery, with disc 4 ft. 3 in. diameter, running at 200 revolutions per minute. One 10-inch leakage pump, with disc 3 ft. 6 in. diameter, running at 250 revolutions per minute, coupled to a 9-horse power nominal gas-engine. Tank for water, 38 ft. by 7 ft. by 4 ft. The two 26-inch pumps and the 10-inch pumps would empty the dock, as before described, in two hours. Each of the 26-inch pumps would deliver 1760 cubic feet per minute on the average; and the 10-inch pump, 260 cubic feet. The weight of water lifted in two hours would be 12,600 tons; and the consumption of gas for the purpose, as in the former scheme, would be 8000 cubic feet. The size of gas-main required, if not very long, would be 7 inches diameter. The delivery-main from the pumps would be 40 inches diameter. The size of the house required for the engines and pumps was 50 feet long by 28 feet wide. It was suggested to sink this below the level of the ground, so as to reduce the length of the suction-pipe to 16 feet; and, if desired, the space above the house could be utilized for other purposes. The engines ultimately adopted varied somewhat from either specification; but the leading particulars of the engines, the results of the tests to which they were subjected, and the diagrams taken, were as shown.

The matter of cost I do not propose to deal with as it does not affect the value of the information so much as the description of the plant; and to myself it was of interest to find that gas-engines could be successfully applied to such important work. The makers recommended the use of producer gas for general purposes, but not in this particular case. The work being intermittent in character, and time being a special feature of the scheme, they pointed out that the work could be done with town gas, while producer gas was being prepared.

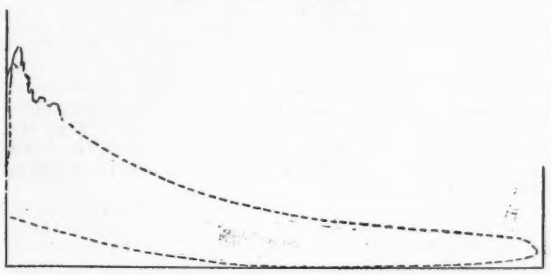
Gas has been proved in the workshop to be most handy and cleanly for brazing and enamelling; for heating irons for tinmen, coppersmiths, tailors, and hatters; for painters' use in removing paint; for coffee roasting; and for numberless other purposes. The intensity of heat that may be obtained—either concentrated or diffused—and the ease with which it may be controlled, make it a most valuable aid to the work of the skilled mechanic or chemist. In such a town as Romford, where factories at present are not predominant, we look more to domestic appliances such as cookers, grillers, bath-heaters, and heating-stoves as a means of increasing our business; and the letting of these several articles on hire, coupled with the extension of the prepayment meter system, has placed them within the reach of every mechanic, and added to the comfort of many homes.

I was not at first impressed with the idea that the prepayment meter system and the free fitting of houses, would prove suitable to this particular district, and only entered upon this class of business at the express request of my Directors. As anticipated by myself, the annual consumption of gas per meter in this town has not averaged so high as in many other places; but the returns are sufficiently good to determine it a successful system. At the outset, we endeavoured to frame regulations as to the number of lights, &c., that should be fitted in any house; and were inclined to limit the supply to about three lights and a boiling-stove. We find, however, that personal inspection of each house, and a study of the requirements of the individual, is better than adopting a hard-and-fast line. If a light is asked for in a particular place, and reason given why it is



40-Horse Power (Nominal) Engine.

Cylinder, 18½ inches diameter.
24-inch stroke.
190 Revolutions per Minute.
Mean Pressure in Cylinder, 89 lbs.
Indicated Horse Power, 137.



16-Horse Power (Nominal) Engine.

Cylinder, 11½ inches diameter.
24-inch stroke.
210 Revolutions per Minute.
Mean Pressure in Cylinder, 92 lbs.
Indicated Horse Power, 60·75.

required, then by all means fix it. The service and meter constitute the principal part of the outlay on each house; and the addition of a bracket or pendant means only 2s. or 3s. extra. Even acting liberally in this way, expenditure has been kept within reasonable limits; the average cost of fitting per house being £4 10s.

One other point in this connection. We supply a boiling-burner or griller free; but if a larger cooking-stove is asked for, we require a rental. If we could feel sure that the cooker asked for was required for use, and not in imitation of a neighbour already possessed of a similar appliance, no rental would be necessary; and the best possible proof that it really is wanted for use, is the fact that the gas consumer is ready either to pay a few shillings for fitting, or else a small quarterly rental for the stove.

This subject has been before the Association on several occasions; but I do not think it has yet received sufficient attention. A paper dealing with all the details of obtaining customers, fitting houses, and especially with the best methods of collection and book-keeping, would be of great service. Some companies deal with collection as rapidly as possible—simply putting the contents of each money-box into a separate bag, labelled for identification, and then completing the work in the office. Some even go so far as to ignore any question of shorts or overs; contenting themselves with the idea that one about balances the other, and therefore the company does not suffer. This system is manifestly unfair; and it may be compared, with insufficient attention to the accuracy of measurement, with ordinary meters. Any such irregularities are certain to be discussed between the

consumers, and give rise to dissatisfaction; and therefore they demand the closest attention from companies' officials.

My own system is to have the work done by a competent and trustworthy collector, who reads the meter and prepares the account before the money-box is opened in the presence of the consumer. He says: "You have used so much gas; I require so much money." Any discrepancy between the account and the amount deposited is at once dealt with, and a feeling of confidence established between the consumer and the Company. In two years, we have only had one case in which the consumer declined to pay an amount asked for shortage; and this unfortunately occurred at the first collection of this particular account. As payment was positively refused, the meter was removed, and the account closed. We have only a few consumers on this system; but the statistics may be useful.

Houses supplied with prepayment meters and fittings . . .				140
,, ,, with prepayment meters only				22
Outlay on meters	320	5	6	Total
,, on fittings	310	0	7	£630 6 1

Average outlay per house for meter and fittings .	£4	10	0
,, consumption per meter per annum .	8650 cubic feet		
Total annual consumption of gas	1,210,200 ,,		,,
,, ,, collection, including stove-rents . . .	£340		
Cost of clerical work and collection, six times annually	£16	4	0

I expect improvement in each of these details, for the following reasons: First, that we have certainly a much better class of consumer waiting to be supplied than have yet been dealt with, and from whom we may expect a larger annual consumption; and, secondly, that the work of collection will be carried on at a decreased rate per house as the number of consumers is added to. At present, they are scattered over a wide area; no restrictions having been imposed, nor any attempt made to confine the system to any particular district.

One other benefit to be derived from the use of the prepayment system, is the reduction in the number of bad debts. In the case of new and doubtful customers, I invariably suggest the use of a prepayment meter, and find it easier to obtain the money in this way than by demanding a deposit as security, in addition to which we save the 5 per cent. we are compelled to pay on the amount deposited. Persons of limited means starting in business, who really require all their money as working capital, are in this way enabled to obtain a supply of gas, and are at no time inconvenienced by the presentation of a heavy account for payment.

It may be within your recollection that at one of our recent meetings the Chairman of the Company then visited requested some member of the Association to prepare and read a paper furnishing information relative to the working of the sliding-scale and the apportionment of profits to reducing the price of gas and the raising of dividends above statutory rates. It is a point that cannot be said to come within the range of the engineer, but is distinctly a matter of administration of the company's business by the directors. It is, moreover, a delicate subject to handle without creating offence; and it must therefore be distinctly understood that the remarks made have no application to any particular company, but are merely general expressions of opinion.

The Metropolitan Gas Companies—acting presumably upon the idea that their affairs have been closely scrutinized for the purpose of determining the actual value of gas in the districts supplied, before the initial price was given—have availed themselves of the powers conferred by their Acts of Parliament, and have taken for the shareholders a considerable portion of the increased dividend to which the sliding-scale entitled them. The procedure of most Provincial Companies in this matter has been very guarded, and rightly so.

An examination of the Parliamentary Returns shows that, at all events in the case of provincial undertakings working under Provisional Orders, the Board of Trade usually exercise a fairly liberal spirit in fixing the initial price for companies applying for powers. After due inquiry into the value of material and labour in the particular district, and any special circumstances attached to the company's working, the Board only impose such conditions of price and quality as are likely, with proper care and management, to result in the maintenance of profits up to the amount required for payment of statutory dividends, and leave such a margin as to place the company in a safe position.

Taking this into consideration, it does not appear prudent that any company working under such conditions should avail themselves of the first favourable opportunity of lowering the price of gas to increase the dividends above the statutory rate, especially if the increased profit has been obtained under conditions that did not exist when the initial price was fixed. The directors of such a company should first assure themselves that their works are ample in capacity, and in thorough working order to fulfil all the obligations they have undertaken. If the contrary is the case, and any considerable outlay is required, they may still be able, with advantage to the company, to lower the price of gas without paying a higher rate of dividend, owing to the increased amount of capital. They should feel certain that they are supplying gas at as low a rate as the circumstances of the district will permit, which may be judged to some extent by a comparison with adjoining companies; and also that the price charged for gas will not prove a hindrance to any particular class of business. In order to encourage the use of gas-engines or other trade appliances, it may even be advisable to adopt a differential rate for gas, in order that the price charged may be sufficiently low to compete with rival methods; though users of motive power are daily recognizing that there are many advantages attending the use of gas beyond what can be discovered by any calculation of the difference in the value of coal when converted into gas or employed for the purpose of raising steam.

Care should be exercised in the case of alteration, replacement, enlargement, or extensions of plant or mains, that the proper amount only is charged to capital account. Plant once provided out of capital must have its representative value. Replacements or renewals may be charged to revenue; and additions, or the actual increase in value due to enlargements, may be placed to capital account. Care should also be taken before raising the rate of dividend that, unless from some unforeseen labour strike, accident, or some other misfortune, no necessity should occur for going backward, or except for some very special reason for making use of any reserve fund to maintain dividends, but that they should be fairly earned in the year's working.

Having safeguarded themselves on these and any further points that may commend themselves to the directors of the undertaking, it appears perfectly legitimate that the shareholders who have placed the conduct of their affairs in the hands of gentlemen possessed of business capacity combined with prudence, should be permitted to participate to a limited extent in the results of their successful business methods.

A company about to raise additional capital for some extraordinary expenditure, may be inclined to raise their rate of dividend in the hope of obtaining a higher price for the shares, and consequent larger amount of premium capital; but this can only be considered bad policy. Shares are constantly changing hands, and may have so high a rate of dividend quoted as to raise dissatisfaction in the mind of every user of gas, and yet yield the investor but a very moderate return on his outlay; and unless the rate of dividend at the time of purchase is maintained, the investor is likely to make as great an outcry as any dissatisfied consumer. The sliding-scale is based upon equitable principles; but it is certain that it requires to be used with caution and judgment, if the effects of its working are to have a lasting value.

It is unusual for any discussion to take place upon the President's Address, though why this should be so I am at a loss to explain. Statements not open to challenge cannot be generally accepted; and therefore under existing conditions presidential addresses can have but little value. Unless the Association is better supplied with papers at our next meeting than on the present occasion, the members are at liberty, if they think it desirable, to discuss any point that I have raised, if they will be good enough to notify their intention to the Secretary. In this way, we may very possibly raise some debate useful alike to the Association and to your President.

At the close of the address,

Mr. J. CARTER (Lincoln) said it was his pleasure and privilege to ask the members to express their appreciation of the service the President had rendered to them by the preparation and reading of his address. It was an unwritten law of their gatherings, as they had been reminded, that the utterances of the President in his address were safe from criticism; and, in this particular instance, it was perhaps as well for the members that they were, because he was not certain that any of them would be guilty of the audacity that was requisite to criticize any statement emanating from the gentleman who now occupied the chair. They all expected of Mr. Child a deliverance that would deal, with care and intelligence, with matters of interest in connection with the manufacture and supply of gas; and he ventured to say that, having listened to his remarks, none of the members were disappointed.

Mr. J. BARTON (Peterborough) seconded the motion. He said the address contained points of interest that would be worth reading again and again.

The PRESIDENT, in reply, said he could only thank the members for listening so attentively to what he had prepared.

Mr. H. WIMHURST then read the following paper on the

WORKMEN'S COMPENSATION ACT, 1897.

The Workmen's Compensation Act of 1897, which came into operation on July 1 is of no little moment to gas managers, whether engaged upon large or small works. It will press unduly upon the smaller; they being less able to bear any great and sudden charge upon them which the Act entails. Therefore the question one naturally asks himself is, how best to prevent uncalled-for expense on the revenue of the undertaking. In my opinion, there are only two ways out of the difficulty—either create and maintain an insurance fund by the placing aside of a certain sum annually out of the profits of the undertaking, which sum can be readily ascertained by past experience in this direction, *plus* a percentage for the extra risk entailed under the Act; or (and to my mind much the better and safer plan for small works, with less than an annual wage payment of £6000) to secure oneself with a perfectly good and sound Insurance Company, even if the premium is a few shillings per cent. more than some other and less sound offices are asking.

When we consider the amount of risk the offices run of actions at Common Law, under the Employers' Liability Act, and, lastly, under the Workmen's Compensation Act, 1897, I do not

think the reliable offices are asking too great a premium rate from gas undertakings when it is not more than from 8s. to 10s. per cent. upon the amount of the annual wages paid. We may also consider that the rates as at present fixed are merely experimental, and will in the near future be greatly reduced, when the offices see that the risk entailed upon them by gas-works insurance is much less than they anticipated, though the Act will certainly make workmen much less careful in following their daily occupation.

There is already an indication to amend the Act, at the instance of the Parliamentary Committee of the Trades Union Congress; and a no less authority than Mr. Asquith has indicated his general approval of it in a letter to Mr. S. Woods, M.P. The amendments, as drafted by this body, are: Provision for the payment of the first two weeks' injury; abolishment of the doctrine of common employment; and provision against contracting out. It also abolishes the principle of contributory negligence, and provides for injury to health. Should the Act be thus amended, our expenditure under this head will have a tendency to increase rather than diminish.

I should gladly welcome a federation of the Incorporated Gas Institute and the Institution of Gas Engineers with the District Associations, in order to form an Insurance Corporation for the insurance of gas undertakings under the Workmen's Compensation Act of 1897. With the London offices and staff of the two Institutions, one cannot conceive any great difficulty in this direction, especially if the Councils of the two societies could arrange for an early amalgamation of their bodies. If such an Insurance Corporation could be formed, I have no doubt it would meet with the approval and support of all gas-works officials. Such an united Association could obtain a very low premium rate from the sound Insurance Companies, very much to the benefit of all the insurers.

The North of England Gas Managers' Association, with their efforts in this direction, have been enabled to insure at 9s. 6d. per cent. to the extent of £120,000 annual wage payment, spread over 40 works. If this can be accomplished with 40, what could be obtained by the amalgamating of 400 to 600 works for such a purpose? The answer would probably be, a premium rate of 5s. to 6s. per cent. Surely, then, this needs our active and immediate attention, to bring about such a desirable result.

Discussion.

Mr. J. Carter (Lincoln), called upon to open the discussion, said he was not quite certain that he had any definite opinions on the question dealt with by Mr. Wimhurst. He was almost as much pleased with the omissions of the paper as with the actual statements. He was glad that the author had not given himself over to anything like a wild denunciation of the Workmen's Compensation Act, which had been received with very mixed feelings in all industrial circles. He (Mr. Carter) thought that any legislation that imposed upon employers of labour the utmost care in the conditions under which workmen had to do their daily toil, and which placed upon the employers the full financial responsibility for accidents, ought to be received without any very violent feelings of dissent. It should first of all be their earnest endeavour to carry out what he took to be the primary object of such legislation—that was to say, everything should be so arranged that the liability to accident should be reduced to a minimum. He must confess that it was rather distasteful to him to discuss a subject like this in any way, when looked at from one point of view. He did not like to talk upon the question of workmen's lives and limbs in connection with £ s. d. He did think above everything else their first object should be to preserve their workmen from accident. His own opinion was that a great deal too much had been said about this question. They were, he supposed, now passing through an experimental or transitional state. The Act was quite new; and the insurance companies scarcely knew how high the terms should be which they ought to impose upon insurers. The question of how low they should be, never seemed to have entered their heads at all. He thought they might wait to see the course of events during the next twelve months; and probably by that time rates would be quoted by all the insurance companies which would be far more moderate and reasonable than any they had yet heard of.

Mr. John West (Manchester), on the invitation of the President, said the question dealt with in the paper affected a large number of manufacturers perhaps more than it did the proprietors of gas-works. It might be interesting if he explained what the manufacturers had been doing in the Manchester district. They considered the new Act was very oppressive upon the capitalist; and while they desired to protect the lives of every workman, as well as their own (because the employers were as liable to accident as the workmen), they thought they should not be called upon to pay when men, through carelessness, contributed to any accident, as was often the case. Many years ago, the Iron Trades and Engineers' Association in Manchester insured themselves among themselves; and it had been a very fortunate thing for them that they had kept statistics showing upon the average which classes of men were more liable to accident than others. They had gained experience which showed that men might be more liable to accident in one particular branch of engineering than in others; so that, when the new Act was forced upon them, they pretty well knew the position they were in, with the exception of the unknown quantity—the contributory accidents, which so frequently occurred. The manufacturers considered the course they should take under the new Act; and they decided to assess themselves at the rate of 9s. per cent., and so insure themselves. The accidents had been very small matters. The same office that looked after the other affairs of the Association attended to this insurance business also; and the advantage the manufacturers had secured was this: Instead of paying to an insurance company (who really did not know what they were about, seeing that the matter was, as Mr. Carter had put it, still in an experimental stage), they assessed themselves at a figure which was about double what was necessary. But, at the same time, they made up their minds that they would increase their capital to a very considerable extent, so that they would be prepared to meet any emergency. Therefore, if they had made a mistake in assessing themselves at such a high figure as the 9s. per cent., it would increase their capital, and then, when it reached a certain point (which had been decided upon), they would reduce the rate of payment. The effect of this arrangement, which had been carried out for many years in the Manchester district, was that the whole of the engineers connected with the great Federation that was formed during the strike in the engineering trade had joined the Association. They had discussed whether or not they would ask an insurance office to take part of their risk; but they decided that they were powerful enough to take the entire risk upon themselves. He thought the gas companies might very well follow on the same lines, which he was glad to see was suggested by Mr. Wimhurst. Under the new Act, they found men claiming immediately the least accident occurred to them; and he was sorry to say some of the claims were of a very doubtful character—indeed, a large number of the men were only "on" for a few weeks. There was no doubt the Act had not been well considered; and, while Mr. Woods and Mr. Asquith might have something to say in favour of amending the Act in the way indicated in the paper, he was glad that the Association to which he had referred was strong enough to claim a hearing in connection with any proposal to make a change. It was the desire of all fair-minded employers to meet reasonable demands arising from any legitimate accident that might occur on their works; but he did not think it right that they should be called upon to compensate men for any accident arising from drunkenness, semi-drunkenness, or carelessness, which, he was sorry to say, had already occurred. All employers should have such an amount laid by as would enable them to pay for accidents that occurred legitimately, and the amount should be a tax upon the public by charging more for their wares. He thought the gas industry might with advantage follow the example of the Engineers' Federation. It had been suggested that gas undertakings should insure in insurance offices; and as they had few cases of accidents, perhaps it would be as well. At the same time, he did not see why The Gas Institute should not do as the engineers had done, because the old insurance people were simply protecting themselves by asking exorbitant premiums; they were bound to ask for something large, seeing that they did not know what the Act would bring about. He was decidedly of opinion that gas companies might form an ample insurance fund among themselves.

Mr. J. H. Troughton (Newmarket) said that some six years ago his Company somewhat anticipated the Workmen's Compensation Act by insuring their men against accident under the old Employers' Liability Act, actions at common law, and also for half pay in the event of men being incapacitated through accidents. They paid a premium of 15s. per cent. for these benefits, which they had enjoyed for six years, during which time they had paid about £70 altogether in premiums. In this period, they had only had six very slight accidents; and the amount of compensation received from the insurance company totalled £14, or exactly 3s. per cent. on the wages paid. When the Workmen's Compensation Act came into operation, they wrote to the insurance company to know how much extra would be required for the additional risk. They were quoted a premium of 25s., which, of course, his Directors refused; and they also decided not to insure again for a time, seeing that they had a small insurance fund, upon which they could draw in the event of any claim being made upon them. Since then, the rates of the insurance companies had been very materially reduced; and only the previous day he signed a proposal form to insure the workmen for full benefits under the Act at 9s. per cent. Consequently, instead of paying 15s. under the old Act, they were insuring for less money against additional risks. He did not think that 9s. per cent. on the wages paid was by any means unreasonable. They had simply decided to insure for one year or longer as was thought desirable; but in the event of The Gas Institute formulating a scheme by which gas companies could amalgamate and insure at a cheaper rate, his Company would, of course, join.

Mr. J. W. Helps (Croydon), invited to take part in the discussion, said his Company anticipated some such legislation as the Workmen's Compensation Act several years ago. Twelve or thirteen years since, they started a fund which they called their Sick and Burial Fund; and among the rules of the fund was one which allowed the Engineer, at his discretion, to pay any man who met with an accident during the discharge of his duties a sum not exceeding two-thirds of his weekly wages at

the time the accident happened. During the twelve years, they had kept a careful record of the amounts expended, especially those under the head of accidents; and when he had to report to his Directors on the subject of insurance, he took the figures out. He found that, during the twelve years, they had paid in wages something like £180,000; while they had only spent £140 in compensating the men who had met with accidents for the time they lost. It might be said that they were not quite so particular under the rules as they would be under the rules imposed upon them by the Workmen's Compensation Act, because, for instance, supposing a man met with an accident within a couple of days before pay-day, he (Mr. Helps) might have said to the person paying the wages: "Pay him his wages for these two or three days; and then, if he is away next week, put him on the sick fund." But that would be more than compensated for by the clause in the Act which did not compel any company to pay the workman for the first fortnight during which he was suffering from an injury. The matter had been frequently discussed by his Directors; and they were still undecided as to what course they would adopt. He might state that the figures he had quoted worked out to something like 1s. 7d. per cent. By their Private Act, they were given power to form an insurance fund, which now amounted to some thousands of pounds; and he had advised his Directors that he thought they would be perfectly within their rights if they used the fund for the purpose of compensation under the new Act. The clause in their Act giving them the right to establish such a fund was something to this effect: The Company have the power to form an insurance fund, and to use it to meet any claim for any accident that may arise, which accident could not have been prevented by due care and forethought on the part of the Company. Therefore he considered that they might fairly use this money to meet any claim made against them under the new Act. If they could not, what was the fund intended for? His Company had wisely insured their boilers against accident; and they had insured the works against fire. Therefore he did not see what accidents could happen there (save those to men) for which they would have to take money out of the fund. He agreed with a previous speaker, that perhaps too much had been made of the large premiums required by the insurance companies, because they had had to quote without experience of what might happen. At the same time, he could not help thinking that the insurance companies, if they had liked, might have obtained information that would have enabled them to ask lower premiums. It would have saved a lot of trouble and discussion on the subject. The whole question had now been placed in the hands of a well-known actuary; and he was going into the matter. They had given him all the particulars in their power; and no doubt he would be able, with the figures at his disposal, to find out what was a fair percentage on the wages to set aside, and devise some scheme that would be satisfactory to the Company he (Mr. Helps) represented at Croydon.

Mr. E. W. Smith (Chelmsford) said his Company considered the Workmen's Compensation Act imposed a great liability upon them; and they met it the only way they could do, by insuring. It would be difficult for him to believe that the insurance companies could not obtain figures upon which they could have worked in deciding the amount of premium they should charge. Surely, since the passing of the old Employers' Liability Act, some records had been kept of the number of accidents that had happened. His Company insured under that Act; but their experience had differed from that of the Newmarket Company. He believed the amount of compensation they had received during the years they had been insured was about equal to what had been paid in the shape of premiums. However, most, if not all, of the accidents that had happened had been very small, and only kept the men away from the works for one or two weeks. This was a point of great importance to them, as a proposal had been made to amend the Act by providing for payment during the first two weeks' injury. In his opinion, the large employers of labour should try to retain the existing clause as long as possible. He very much admired Mr. Carter's fair-mindedness; but personally he could not help thinking that the new Act imposed upon employers a greater responsibility than they ought to be expected to take, inasmuch as accidents were liable to occur over which the employer could have no control or that could be traced to his carelessness or negligence.

Mr. F. Prentice (Ipswich) said that the Company with which he was connected had not had very much experience with the insurance companies, as they preferred to take their own risk, whatever it might be. From the experience they had had for a good many years past with their sick fund, they did not think the risk was a very grave one, or one they need shrink from. They had a workmen's club, to which the men subscribed 3d. each per week, which entitled them to 10s. per week when they were ill. Any deficiency in the fund was made up by the Directors. Sometimes they were called upon to the extent of £50, and at other times the club had money in hand. They had never had any serious disaster such as might lay a number of men low. That perhaps would be rather a serious position to find themselves in. But what he had stated explained the position they were in at present; and, until they saw some reason for altering it, he believed they would continue in the same course—at all events, until the ridiculously high rates of the insurance companies were reduced. The Ipswich Company had been quoted 25s. per cent., and then 12s. 6d. per cent., which utterly precluded the idea of insuring in the usual way.

Mr. Smith inquired whether the 9s. per cent. referred to by Mr. Troughton covered accidents during the first two weeks.

Mr. Troughton said he did not think so. The Act provided that the first two weeks should not be paid for. The 9s. covered everything contained in the Act.

Mr. E. W. T. Richmond, responding to a call from the President, said the remarks that fell from Mr. Carter were worthy of careful consideration; and he could quite endorse them. They should all look at this question in a broad mind. The working man had only his labour to sell. He had no capital, and no resources; and if accident prevented him following his occupation, he had no means of keeping the wolf from the door. In his opinion, the capitalist should readily undertake all the risks. The heavy rates proposed by the insurance companies throughout the country were greatly to blame for the indignation that had been displayed by the great employers of labour; but the Act had been in operation for three months, and the indignation was now simmering down. He saw by the paper that the North of England Gas Managers' Association had been enabled to insure at 9s. 6d. per cent. to the extent of £120,000 annual wage payment, spread over 40 works. His Company had done better; they had a policy for £30,000 at 7s. 6d. per cent. Of course, they were quoted all sorts of rates at the commencement. The first figure was 25s.; then they were quoted lower; and eventually they got down to 6s. 6d. They, however, decided to pay the extra shilling, as they preferred going to an office which they knew had a substantial capital at its back. Taking 7s. 6d. on the wages paid, it did not by any means handicap production in such a way that it need be held up as a bogey. He himself had no fear as to the results that would follow the working of the Act.

The President said it appeared to him perfectly right that the industries of the country should be burdened with the results of accidents that could be properly described as such; but one point that struck him was that there should be some process of inquiry by which it could be determined whether or not the sufferer from an accident brought it upon himself by a wilful act of his own, or by, as Mr. West plainly put it, drunkenness or semi-drunkenness. A man who so brought about an accident, by which he was himself injured, and perhaps property too, should be debarred from becoming a burden on those who employed him. If an accident was unpreventable, any workman injured by it should be compensated by his employers. A gas company would not be the first to withdraw themselves from such an obligation. He believed they would spend any amount of money to render their plant so safe that their men could carry on their work with perfect impunity.

Mr. Wimhurst, in closing the discussion, said he cordially endorsed the remarks made by Mr. West; and he hoped and believed that a federation of The Gas Institute and Institution of Gas Engineers would take place. Then could follow the insurance, under the amalgamated body, of all the gas-works in the kingdom, at a much cheaper rate than they were asked to pay at the present time.

A vote of thanks was passed to Mr. Wimhurst for his paper.

Place of Spring Meeting.

A conversation followed as to the place of the spring meeting. According to Mr. Wimhurst, some of the distant members had complained of the inaccessibility of Peterborough; and therefore, on his motion, it was resolved to visit Cambridge for the next meeting.

Votes of Thanks.

Resolutions were next passed heartily thanking the District Council for the use of the Council-Room, and the President for the manner in which he had conducted the proceedings.

Following the meeting, the visitors, on the invitation of the President, had a pleasant drive in the surrounding country—passing through some pretty undulating scenery, which must have occasioned surprise to those who had regarded the flatness of Essex as its common characteristic. Shortly after their return to Romford, the members dined together at the White Hart Hotel. The succeeding toasts were interspersed with some well-rendered songs; and altogether the entertainment provided formed a fitting conclusion to a most enjoyable meeting.

The Examinations in Gas Manufacture.—The programme of the Technological Examinations of the City and Guilds of London Institute for the session 1898-9 has been published; and, as usual, its pages contain a mass of information which students who intend presenting themselves for examination will find useful for their guidance. In "Gas Manufacture," the examination is fixed for Wednesday, April 26, from 7 to 10 p.m.; and the Examiner will again be Mr. Alfred Colson, M.Inst.C.E., of Leicester. An indication is given of the subjects on which the questions will be based in both the ordinary and honours grade, and also a list of the questions set in this year's examination, as published in the "Journal" for May 10 last. The works of reference recommended will be found on p. 43 of the book; and the names of instructors in "Gas Manufacture" on p. 213. The publishers of the book are Messrs. Whittaker and Co., of Paternoster Square; and the price is 10d. net.

TRADING BY MUNICIPALITIES.

The question of trading by municipalities is one in which most readers of the "JOURNAL"—occupying as they do positions of various grades in undertakings which are regarded as eminently suitable subjects for municipalization—have more or less a direct personal interest; and therefore three papers which were read before the Economic Science and Statistics Section of the British Association on Monday last week will have some claim on their attention.

The first contribution was by Mr. G. PEARSON, and he dealt with the subject generally under the title of "Municipalities as Traders." Without much preface, the author dropped at once into an exposition of what he considers are modern municipal duties. Drainage was first recognized as a public duty forced on municipalities by the density of the population, to be followed by a public system of cleansing. At a comparatively recent date, a municipal water supply was looked upon as a first step in a downward course leading to the pit of socialism; but few at the present time so regard it. The provision of light at a more recent date stood in the same position; but the advocates of the purchase of gas and electric light undertakings now form a majority in most of the municipal councils. The growth of municipal trading is best shown by the growth of municipal indebtedness, by means of which municipal trading has been rendered financially possible. The loans to municipalities outstanding in the year 1875 amounted to £92,820,100. These outstanding loans had grown by the year 1895 to £235,335,049—an increase of £142,514,949, or at the rate of 153·5 per cent. in the twenty years. The National Debt was in the year 1875 £768,945,757, and had decreased in the year 1895 to £656,998,941, or a decrease of £111,946,816 in the twenty years. It will be seen from these figures that the increase of local indebtedness exceeds the decrease in the national indebtedness by £30,568,133. Mr. Pearson gives a list of the purposes to which the loans representing local indebtedness have been applied. Among the items water-works account for £43,970,490; and gas-works, for £16,931,943. Taking gas, water, and dock works, as three of the largest classes of municipal trading concerns, he finds that the debt now existing (not the sum originally raised, which would, of course, be much larger, the present reduced figures being brought about by the operation of the sinking fund arrangement made in respect of each of these loans) shows the indebtedness at £93,680,425; being about £860,325 more than the total local indebtedness in the year 1875. These figures indicate the great expansion in municipal trading, by showing in some degree the growth of the municipal capital invested in it during the last twenty years; and the totals do not remain stationary. The figures referring to the electric light are very instructive, and show the growth of municipal trading in electric current. Up to the year ending March, 1895, £1,378,818 only had been invested in these undertakings by local authorities; but Mr. Pearson estimates that the capital invested up to the year ending March, 1897, was £4,000,000, and thinks that, by this time, the sum must have grown to nearly £6,000,000.

Having shown the growth of municipal trading as evidenced by the growth of the capital account, Mr. Pearson considers next the extent to which it may be extended to the advantage of the public. He thinks that municipal trading should be confined to the provision of those necessities of civilization which are so large as to be beyond the power of individual effort to supply, and which do not form part of any Government department. The effort of the individual will generally produce more economically than either a company or local authority. But as between a company and a local authority there is, says the author, economically speaking, very little to choose; and corporations can claim to be free from the misappropriations of capital which appear to be incident to the formation of so many of the companies which from time to time come under notice. Thus the cheapness of the price of money when raised on the credit of a local authority as against the dearness of it when raised by a company must always enable a local authority to trade on a smaller gross profit than a company, and, therefore, requires less to be abstracted from the pockets of the consumers to secure success to the undertaking, whatever it may be. Consequently he is of opinion that the supply of water, gas, electrical energy, and tramways should be in the hands of the local authority. He suggests that, save under exceptional circumstances, all municipal work, such as the erection of buildings and other matters of that kind, should be undertaken by the municipality. Where for any reason whatever there is a lack of outside competition, then these works can generally be carried out more economically and always better by the municipality than by a contractor. There is another point which has to be considered—viz., the formation of "rings" and "trusts," formed with the object of keeping up prices to artificial levels. The only way to meet combinations such as these is for local authorities to face the position and do the work themselves. On the other side, is to be found the question of labour. Local authorities popularly elected are liable to pressure from without, to which the directors of public companies and private individuals are relatively free. Working men have votes, and will use them to serve their own ends precisely to the same extent as other people. But the experience the author has had as a member of the Sanitary Committee of the Bristol Corporation convinces him that a position of absolute neutrality in respect of all trade combinations, and the acceptance of the services of any competent workman, whether unionist or not, extorts a respect even from those who may be violent partisans either on the one side or the other.

In the final part of the paper, Mr. Pearson asks whether municipalities ought to trade for a profit; and he answers himself in the affirmative. Speaking as a municipal man, he would have very little inducement to trade at all but for the hope of success, with its usual accompaniment, profit. Birmingham, Manchester, and other towns trade at a profit; and he fails to see why they should not—subject only to the condition that they do so on the same lines as ordinary individuals and companies, and that they do not secure a profit by charging at a rate higher than would be charged by a company. As an example, he refers to Bristol, where there are 60,000 ratepayers, and under 1000 users of the electric light. The luxury of private lighting by electricity to the few is rendered possible by pledging the credit of the many; and why, he inquires, should not the many reap some benefit from the risk they run, to say nothing of the actual loss which attended the early years of the undertaking, and which was paid out of the rates levied upon them? He considers Parliament will be wise not to put such restrictions as to profit making as are shadowed forth by the report of the Telephone Committee. They may well leave the question of the amount of the profit to be settled by the natural law of supply and demand. The moment a municipality charges more for an article than it is worth, the public will refuse it.

Reviewing the result of municipal trading, Mr. Pearson thinks its advocates have little to fear. Birmingham, Manchester, Glasgow, and other large towns have shown a very good lead, which it remains for others only to follow. Failures are very seldom reported, for the very good reason that there are few to report. There is one other risk which it is impossible to omit to notice. There may be dishonesty in the official, or, still worse, there may be dishonesty in the Council; but the author thinks the risk is small in each case. So far as officials are concerned, business-like regulations may be made which, if powerless to actually prevent fraud, will most assuredly detect it; and he considers that the personal character and position of the members of the various representative bodies, coupled with the fact that more than one or two must be "in it" in order to secure success, will prevent any serious malpractices by the representatives, even if they were so minded.

Mr. EDWIN CANNAN read the second paper on the question "Ought Municipal Enterprises to Yield a Profit in Aid of Rates?" Such municipal enterprise has, he says, been likened to joint-stock companies; the ratepayers being the shareholders. If the parallel were exact, there could scarcely be any question about the propriety of municipal enterprises yielding a profit, since to make a profit is the object of a joint-stock company. How far then, he asked, did a municipality resemble a joint-stock company? In form the two bodies are very much alike; the management of both being committed to an elected council or directorate, and the ordinary members only interfering on rare occasions directly, though citizens or burgesses exercise far more influence on the decisions of their representatives than shareholders. But the basis of membership is very different. The business of both the company and the municipality is economic work for the benefit of their members; but the company perform services for outsiders and distribute profits in money dividends to the shareholders, while, in performing their ordinary functions, the municipality provide commodities or services for their members directly, and consequently have no opportunity of making profits to be divided among them in money dividends. As far as municipal enterprises are concerned, however, the position of the municipality resembles that of the company much more nearly. Municipal enterprise is distinguished from ordinary municipal work by the fact that the commodities or services which it provides are supposed not to accrue to the citizens approximately in proportion to the rateable value of the property with which they are connected, so that it is considered necessary to charge for them by methods and standards different from those which regulate the levying of rates. By hypothesis, then, the business is no longer a merely "mutual" one, in which each member receives direct benefit in proportion to his share, but a business like that of an ordinary company. The municipality ought to be allowed to make a profit for the same reasons as a company are allowed to do so: (1) In order that they may have some inducement to undertake the enterprise which they would not have if they must take all risk of loss and no chance of gain; (2) in order to secure efficient management; and (3) in order that the economic proportion in the production of different commodities may not be disturbed. The arguments against profit-making in municipal enterprise seem to be founded on an antiquated socialism or on a false analogy, either from co-operative institutions or from ordinary municipal work. That there may be cases in which it is not economically desirable that the highest possible profit shall be made is probable, but these cases are less frequent than is supposed; and since when they do occur the damage must be much greater to the locality than to the country in general, and

also be tolerably obvious, there appears to be no need to restrict the freedom of the locality.

Mr. W. M. Acworth read the third paper, on "Rectification of Municipal Frontiers," in which he considered certain recent developments in the life of our great towns tending in the long run to an important readjustment of frontier between private and municipal enterprise. Gas and water supply has, he observes, long been regarded on the ground of their general necessity as natural subjects for municipal ownership. Oddly enough, however, it was reserved for a commercial Company—the South Metropolitan—to make gas really available in the poorest house by the adoption of the penny-in-the-slot system. But with the rapid advance of rival methods of lighting, petroleum, electricity, and now perhaps acetylene, coal gas is much less a general necessary of life than it was. Simultaneously there has been a rapid advance in the use of coal gas as a source of power; and in America they are building gas-engines of 700 and even 1000 horse power. It can hardly be contended that municipal management, with its inevitable rigidity and slowness of method, is better fitted than private enterprise to supply gas power in competition with power derived from other sources. The supply of water few will deny in the abstract to be a natural subject for public ownership. For all that, the question of delimitation of frontier, not between private and municipal ownership, but between the rights of different local authorities, arises in this matter also. For example, the position of the Water Committee of the Birmingham Corporation is, from one point of view, hardly constitutional. They are responsible wholly to the ratepayers of Birmingham, while to the residents 100 miles away in the sequestered Elan Valley they appear in the capacity of universal landlord and sole employer of labour, not to mention sole publichouse-keepers. But it is not by water that the boundaries of municipal enterprise are likely to be undermined. A House of Commons Committee have just reported that competition in telephone service is desirable, and that where the Post Office does not compete with the National Telephone Company licences might reasonably be granted to the local authority. So, as the Corporations of Edinburgh and Glasgow have already applied for telephone licences, municipal telephones will soon probably be tried on a considerable scale. Electric lighting has from the outset been a mixed service, in the hands here of a company, and there of a municipal corporation, subject to this—that the corporation have always been given the refusal before the company were admitted. But in practice the competition has been of companies *inter se*. Last session, however, saw a change. Two local authorities sought, and one of them obtained, statutory power to compete within their district with companies already in possession of the field. But, seeing that the companies possess greater elasticity and adaptability of management, and are not hampered by municipal—which are very often non-natural—boundaries, in some cases the competition will probably be ineffective. In the conclusion of his paper the author submitted that the ever-increasing complication of civilization and the ever-increasing specialization of science, coupled with the ever-increasing interdependence of independently organized local government districts, all tend to a re-adjustment of the boundaries of direct municipal activity.

"Light v. Illumination."—The "Holophane" Company have prepared a useful pamphlet setting forth in plain, yet scientific, language the correct principles of the use of high-power lights for interior and street lighting. The pamphlet is beautifully illustrated from photographs, some of the figures showing new and elegant forms of gas-fittings adapted to the "Holophane" system of light-diffusion. Copies of the pamphlet are to be had by gas engineers on application to the office of "Holophane," Limited. This is a little work well worth having, for the sound information it contains respecting practical lighting by the most modern appliances.

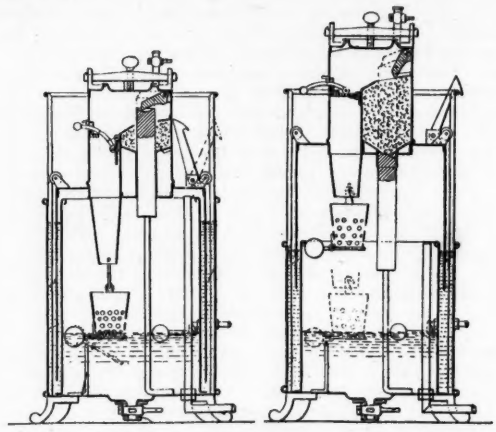
Manchester Association of Engineers.—The Committee of this Association have prepared an interesting programme for the forthcoming winter session, which is to be opened on Oct. 8. Several papers dealing with the question of motive power are to be read during the session. Mr. A. R. Bellamy is to contribute a paper on "Gas-Engines as Motive Power in Engineering Works;" Mr. Henry Hodgson will deal with "Modern Steam-Engine Practice;" and Mr. J. S. Raworth will state his views on "The Generation and Electrical Distribution of Motive Power." "Gas Exhausting and Gas Exhausting Plant" is to be the subject of a contribution by Mr. R. Hargreaves, of Blackburn.

North of England Gas Managers' Association.—Arrangements have been made for the holding of the forty-third half-yearly meeting of this Association at Sunderland on the 1st prox. The members will assemble at 11.15 at the gas offices, where conveyances will be in readiness to take them for an inspection of the Gas Company's station at Hendon. Returning to the offices, after an absence of about two hours, the members will transact the business of the meeting in the Board-room. The principal items on the *agenda* are the Inaugural Address of the President (Mr. C. Dru Drury, the Engineer of the Sunderland Gas Company), and a paper by Mr. J. Holliday, of Scarborough, on "The Policy of Discounts." The Chairman and Directors of the Sunderland Gas Company have invited their visitors to dinner at the Palatine Hotel in the afternoon.

REGISTER OF PATENTS.

Generating Acetylene.—Barnard, E., of Christchurch. No. 19,319; Aug. 20, 1897.

The object of the present invention is "to automatically feed the calcium carbide to water in such manner that only a small proportion at a time will be moistened, and that a small quantity will be brought into contact with the water when the volume of gas in the holder becomes exhausted or decreased, and will be instantaneously removed from the water as the volume increases, so that an extremely sensitive apparatus will be obtained, and only a small body of calcium carbide at a time will be dealt with."



In carrying the invention into effect, a generating chamber (as shown) is employed, consisting of an open topped vessel containing a quantity of water automatically supplied. Into this chamber is introduced a cylinder or bell, closed at the upper end and open at the lower end. In an upward extension of the bell (which may be of smaller diameter) is arranged a reservoir of calcium carbide, adapted to be supplied through a hermetically closed door at the upper part of the extension. The reservoir is fitted with a rod, which passes through a hole in the bottom downward to the bottom of the generating chamber, so that, as the bell descends by gravity, the upper part of the rod will push a charge of carbide over the top edge of the reservoir (or actuate any other suitable feed device), and will thus, each time the bell descends, feed a charge of carbide from the reservoir into a shoot discharging into the generating chamber.

Beneath the shoot, and within the generating chamber, is arranged a perforated bucket suspended from the bell, so as to rise and fall with it. This bucket, the normal position of which is at some distance above the water-level, receives a charge of carbide from the shoot when in that position. In this way, as the bell slowly descends, a charge of carbide will be fed from the reservoir into the shoot and fall into the bucket, which in the continued descent of the bell will partly enter the water in the generating chamber. Thereupon gas will be generated—raising the bell; and the bucket, with its small charge, will be lifted clear of the water, so that only a small quantity of gas will be generated from the partially moistened carbide. The apparatus continues to act in this "automatic and sensitive" manner, regulating the supply of carbide according to what gas is required, so long as any carbide remains in the reservoir.

The apparatus is provided with a valve or shutter, adapted to be actuated from the outside of the extension of the bell, so that the shoot may, when the apparatus is not in use, be effectually closed against moist vapour which might rise into the shoot from the generating chamber.

In order to get rid of the residual spent carbide from the bucket, the bottom of it is hinged to it, and normally held closed by means of a counterweight which, on the descent of the bucket near to the bottom of the generating chamber upon the exhaustion of the gas from the holder, is tripped by a projection so as to discharge the spent matter into a sink formed at the bottom of the generating chamber, and provided with a discharge opening controlled by a valve, through which the matter may be drawn off from time to time.

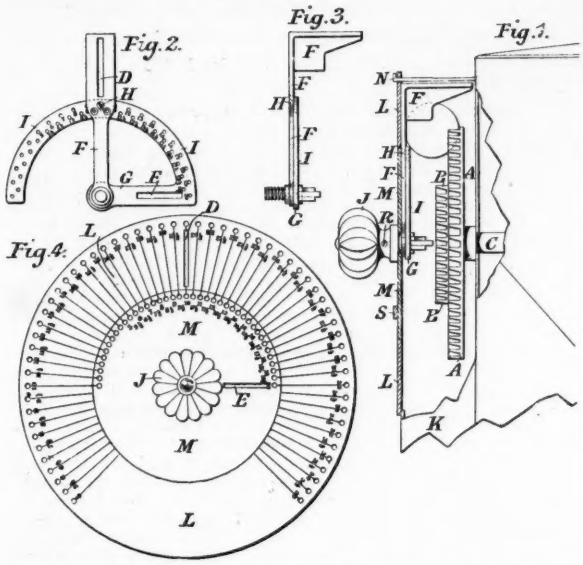
The illustrations are a vertical transverse section of the plant, showing the holder in its depressed position, and a slightly modified apparatus (the dimensions of the carbide reservoir being increased) with the holder in its raised position.

Coin-Freed Gas-Meters.—Glover, R. T. & J. G., of St. John Street, Clerkenwell. No. 20,509; Sept. 7, 1897.

This invention has for its object to so arrange the coin-actuated mechanism of a gas-meter, that a consumer may obtain either a pennyworth or a halfpennyworth of gas at will, according to the value of the coin inserted, or any other two coins that may be desired. This is attained by employing two notched discs of different diameters (but preferably having the same number of notches), the larger one so disposed in relation to the coin-slot as to be actuated by pennies only, and the smaller by halfpennies only; the money-pocket in either case being so constructed that a smaller coin will pass through without enabling the consumer to actuate the supply-valve. The halfpenny pocket is adjustable upon the penny pocket (of which it practically forms a part); and there are two price-changer plates of the kind described in patent No. 25,272 of 1894—one in connection with the penny and the other in connection with the halfpenny pocket, and one being for regulating the position of the penny coin-slot and the consequent amount of movement of the mechanism after the insertion of a penny, the other for regulating the position of the halfpenny slot and the consequent movement of the mechanism for a halfpenny, "each plate, as well as the halfpenny pocket, being numerically divided to ensure promptness and accuracy in setting."

Fig. 1 is a part sectional elevation of a gas-meter showing the two

ratchet or notched wheels A B, on the meter-mechanism spindle C, so that the respective notches can receive the predetermined coins when inserted in the slot D or E of a double-pocket appliance F G (shown in face view in fig. 2, and side view in fig. 3), adjustable one part to the other, and affixable by a set-screw H. In the form shown, the smaller pocket portion has a quadrant shaped band or plate I, with a double set of holes, and with full and half numerals as a guide for adjustment according to the desired quantity of gas to be given for the respective coins, preferably a penny and a halfpenny. Either coin alone can be used; and then the handle J can be turned to bring the coin-pocket round to a fixed stop (not shown) for the release of the coin, which then falls into the bottom of the casing K as the till.



In conjunction with the coin-receiving appliance, a ring-plate L is employed, which can be suspended from any one of the holes near the periphery on the hook N of the casing (as described in the earlier patent referred to), which plate, marked with numerals, as indicated in fig. 4, has radial lines coinciding with the holes and numeral markings of the quadrant plate I, and also of the circular plate M. This is a cover plate to the quadrant I and screw H, and presents a flush face to the meter casing; the coin-receiving appliance D E F G H I behind alone moving when the knob J is operated. The back of the ring-plate L has a stop-piece next its slot, to limit the reverse travel of the coin-pockets and locate them for receiving purposes.

Supposing 25 cubic feet of gas have to be supplied for 1d., the plate L would be unshipped from the hook N and be re-hung from the rim-hole having the numeral 25 under it. This would throw the penny slot D and pocket F farther to the left of the vertical centre. The smaller plate M would then be detached and shifted for its numeral 12½ to coincide with the numeral 25 of the plate L, which would bring its slot-pocket E about mid-distance between the penny slot and the fixed stop for allowing a movement being given to the hand-knob J for half the distance that would be necessary if a penny had been placed in the penny slot. The discharge of the coin in either case is effected automatically when the pocket containing the coin strikes against its fixed stop. Thus if 25 cubic feet of gas be allowed for 1d. inserted, or 12½ cubic feet of gas for each ½d. inserted, the knob J would in each case have to be travelled a greater distance than if only 20 or 10 cubic feet respectively had to be allowed. Consequently the gas-valve would be moved to a greater distance in proportion.

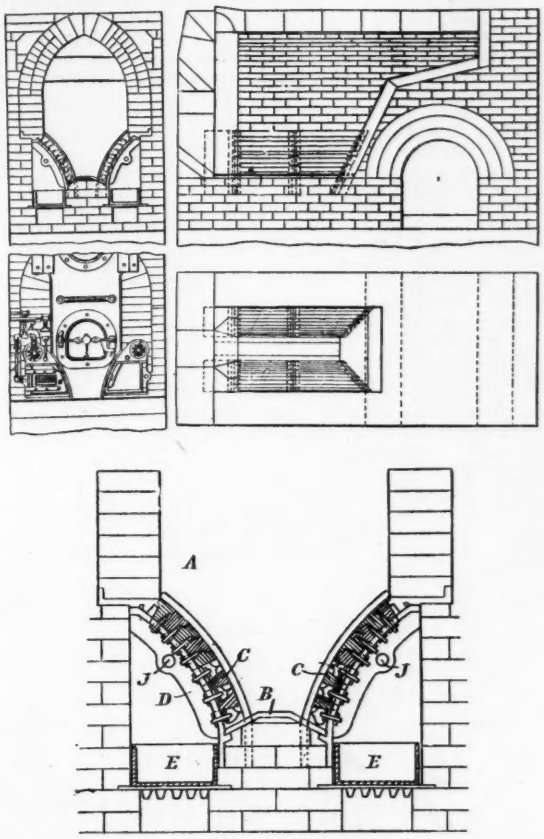
Then, again, in districts where gas is sold at 30 cubic feet for 1d., the plate L would be hung from the hole over the numeral 30, which would place the coin-receiving slot D and pocket F further downward to the left of the vertical centre; and the plate M would also be shifted for its numeral 15 to coincide with the numeral 30 of the plate L for the reception of ½d. for 15 cubic feet of gas. The plate M being fixed in a corresponding manner, its numerals will show the consumer that the quantity to be supplied is half that given for 1d. The plate M has the advantage, as a cover plate, to protect the screw H from being surreptitiously tampered with.

Gas-Producers.—Hislop, G. R., of Paisley. No. 22,518; Oct. 1, 1897.

These improvements in gas-producers consist in combining with a solid hearth of reduced width a series of bars or plates resting on bearing-brackets, rising at a suitable angle so as to form inclined gratings on either side of the solid hearth, and extending therefrom to the brickwork sides of the producer at a suitable height above the solid portion of the hearth.

The illustrations show a transverse vertical section, a longitudinal vertical section, a front sectional elevation, and a sectional plan of the producer; also a view to a larger scale of part of the first section.

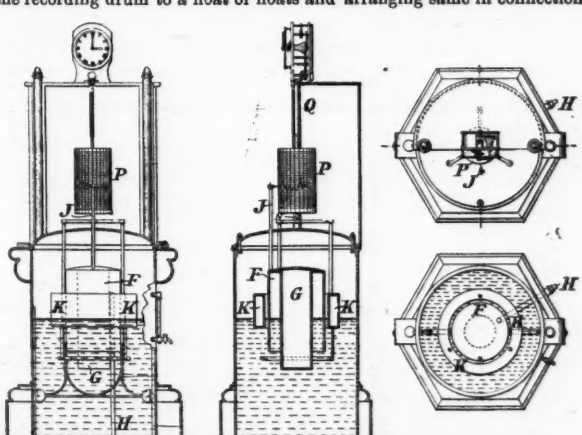
The producer A is formed with a central solid hearth B of reduced width; and the bottom is formed by combining with this reduced hearth a series of bars or plates C, resting on bearing brackets D, rising at an angle so as to form inclined gratings on either side of the solid hearth B extending upwards to join the brickwork sides of the producer. The bars or plates C (laid in any convenient position horizontally or vertically) are provided with slits or equivalent means for the passage of air and steam to the fuel in the producer—brick lining being dispensed with. The rising sides are either straight or more or less curved inwards to give rigidity to the bearing brackets, and provide a larger area beneath for ash and the water-pan chambers E, which are constructed under the angled base of the producer, and into and through which air and steam are supplied to the producer—either induced by the draught of the chimney or forced by a jet of steam or an air-blower. For this latter purpose the chambers E are enclosed with air-tight doors, and to which a suitable blowing device is connected by pipes terminating in adjustable discs or grids, for supplying and controlling the amount of air and steam that may be necessary under varying circumstances and for the production of any desired temperature.



The bars forming the inclined gratings on each side of the hearth are preferably divided into two or more lengths, and are secured at their ends in recessed or pocket brackets built into the brickwork, and intermediately or at their mid points by removable staples or catches engaging the bearing brackets D, and the projections formed on the under sides of the bars C. The inclined gratings C extend from the hearth B to within some distance of the vertical brick sides of the producer, so as to admit air and steam into the body of the fuel within the producer; but in proximity to the brick walls they are replaced by solid plates or checked bars, which prevent the flow of air up the sides of the brickwork and outside the body of fuel. A water-pipe J extends along the under side of each of the inclined gratings, from which water drips into the ash-chambers E.

Pressure Recorders for Gas.—Glover, R. T. & J. G., of St. John Street, Clerkenwell, E.C., and Stagg, W., of Bristol. No. 24,159; Oct. 19, 1897.

This apparatus for registering and recording the pressure of gas in gas-works and other places, is designed to ensure a true register at whatever height the water or other liquid may be in the container, by connecting the recording drum to a float or floats and arranging same in connection



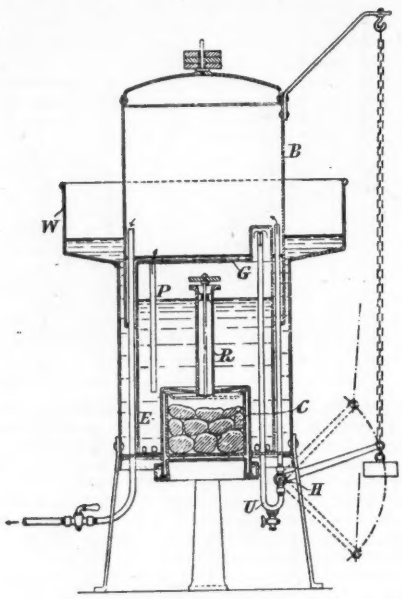
with the revolving and timing mechanism so that it is able to move up and down, and at the same time revolve, and thus be always in register with the marking instrument.

F is the main float, with its open bottom dipping in water, but with

a central drum G to ensure the requisite buoyancy. H is the gas-supply pipe carried up within the float above the water-line, for raising the float by gas-pressure. There is a pencil on the rod J projecting from above the float F, and allowed an up-and-down motion as the pressure of gas varies. K is a band float surrounding the main float F, but free to rise and fall independently of it. The float K is surmounted by rods connected by a cross bar, on which is a stepped pivot carrying a vertical rod with paper-wrapped drum P, the upper end of the rod being free to rise and fall in a slot of the bar Q, the upper end of which carries a bevel wheel operable by the clock to rotate it and the drum P. The paper on the drum is marked with hour divisions and horizontal minute lines, as the recorder of variations of gas pressure and a time recorder as the variations occur.

Producing Acetylene.—Ernst, O., and Philips, A., of Hochst-on-the-Main, Germany. No. 12,510; June 3, 1898.

In a water-reservoir W the generator E and gas-collector G (which is open below) are fixed, in such a manner as to leave an open space between the collector and reservoir, for the purpose of introducing a moveable gasholder B. The generator communicates with the collector by a tube R, provided with a valve arranged in such a manner as to open on the carbide box C being introduced into the generator, and close again on the box being taken out. This object is attained by the following contrivance: To the valve a stem is attached, by which it is raised whenever the box C is introduced. This may be carried out by providing the stem at its lower end with several lateral supports, which rest loosely on the edge of the carbide box as it stands on the under lid. Consequently the valve is only open as long as the carbide box remains in the apparatus. If the box containing the consumed carbide residues be taken out, the valve drops and closes the tube R (and consequently also the apparatus) against any escape of gas or water, until a fresh box is introduced.



The regulation of the apparatus is automatic, and is carried out according to the principle of displacing water; the water being pushed down by the developed gas so as to set free the upper opening in the pipe R from water, until the gas stored is let off.

The gas is conveyed by the pipe U from the upper part of G into a moveable holder, by the rise and fall of which the tap H is regulated automatically. The moveable holder is (as already stated) best introduced into the space between the collector G and the reservoir W. If the tap H be closed, the gas subsequently developed is stored in the collector, and before reaching the lower part of it is likewise conveyed into the moveable holder by a pipe P, specially attached for the purpose.

APPLICATIONS FOR LETTERS PATENT.

18,926.—Brooks, F. H. V., "Everlasting incandescent chimney." Sept. 5.
18,932.—Perl, J., "Production of continuous and durable platinum gas-lighting pellets for illuminating gas." Sept. 5.
18,943.—Söderquist, R., "Production of acetylene gas." Sept. 5.
18,944.—Borchardt, H., "Automatic gas-igniter." Sept. 5.
18,997.—Haigh, B., "Carburetting air." Sept. 6.
19,061.—Lloyd, G. H., "Gas-engines." Sept. 7.
19,064.—Campbell, D., "Gas or oil heater." Sept. 7.
19,086.—Sugg, W. T., "Burners for acetylene gas." Sept. 7.
19,087.—Crawley, C. W. S., "Illumination photometer." Sept. 7.
19,106.—Hansen, G., and Kraefting, A., "Generator for acetylene gas." Sept. 7.
19,130.—Brewin, J., and Rodgerson, J., "Water-meters." Sept. 8.
19,134.—Holloway, G. T., "Acetylene gas-burner." Sept. 8.
19,149.—Goodwin, J. S., "Acetylene generators." Sept. 8.
19,167.—Léry, J. B. de, "Burners for incandescent gas lighting." Sept. 8.
19,228.—Evans, E., and Wright, J. W. B., "Governor for acetylene and other gases." Sept. 9.
19,280.—Gedge, W. F., "Acetylene gas-generators." Sept. 10.
19,307.—Vietinghoff-Scheel, K. von, "Gas-lighter." Sept. 10.
19,323.—Price, A. W., "Production of acetylene." Sept. 10.
19,331.—Biheller, S, "Burners for incandescent gas-lights." Sept. 10.

LEGAL INTELLIGENCE.

The Yeadon Gas-Retort Company, Limited.

Mr. Justice Phillimore, sitting as Vacation Judge, has had before him an application, by a debenture holder (Mr. Richardson) in the Yeadon Gas-Retort Company, Limited, for the appointment of a receiver and manager of the Company. It was stated that the plaintiff held £250 worth of debentures. Mr. Frank Russell appeared for the Company, and consented to the appointment of Mr. John Stephen Barrow. His Lordship made the order.

Gas Exhibition Attendants as "Hawkers."

At the Alresford Petty Sessions on Thursday last, Mr. Sydney Percy Thornton, of Leicester, agent for Messrs. Richmond and Co., gas-stove manufacturers, of Warrington and London, was charged by the Commissioners of Inland Revenue with having traded as a hawker on June 3 last at the Town Hall, Alresford, without having in force a hawker's licence, as required by 51 & 52 Vict., cap. 33, section 2, which enacts that a "hawker" includes any person who travels by any means to any place in which he does not usually reside or carry on business, and there sells or exposes for sale, any goods, wares, or merchandize in or at any house, shop, room, booth, stall, or other place whatever, hired or used by him for that purpose." The defendant pleaded "Guilty." Mr. D. Enright, Supervisor of Inland Revenue at Winchester, prosecuted. He pointed out that, without hawkers' licences being in force, ordinary traders, who pay local rates and taxes on their business premises, would be at a great disadvantage; and considering the importance of the firm represented by defendant, and the extent to which they carried on this kind of business, he pressed for a substantial penalty. Mr. W. W. Horn, officer of the Inland Revenue at Alresford, stated that on the 3rd of June there was an exhibition of gas-stoves at the Town Hall, Alresford. He visited it, and purchased an enamelled iron pan and wire frying basket from a stall on which were other articles exposed for sale. The defendant informed him that, although Messrs. Richmond and Co. were the makers of the gas-stoves, they did not make the other cooking utensils. He further stated that he should have to account to Messrs. Richmond for the sale of the utensils; but he was unable to produce a hawker's licence either in his own name or that of the firm. Defendant also stated that his firm sometimes had about twenty similar exhibitions in one week. Neither defendant nor his firm usually resided in the town. In reply to the Bench, Mr. Enright said a separate hawker's licence would be required for each agent so trading. Defendant, who said he acted in ignorance, as it was a custom of the trade, was fined £5 and costs.

Plundering Prepayment Gas-Meters.

"It would seem that the penny-in-the-slot gas-meter, rapidly as it has made headway among a certain class of consumers, and satisfactory as it has no doubt proved to the companies, has much to answer for as an encourager of crime." This was the comment of the "Daily Telegraph" on a case which came before Mr. Plowden, at the Marylebone Police Court, on Monday last week. The Gaslight and Coke Company were interested in the matter; and Mr. Humphries, who represented them, stated that, since the introduction of the prepayment meter system, hundreds of robberies had been committed, in many instances by consumers themselves, who, in hard-up times had been tempted to break into the unguarded money-box on the premises; but more often by practised thieves, who, aware that "slot" meters were not infrequently placed in the coal-cellar or pantry in the front area, went in the night, and, burglariously breaking the meters open, despoiled them of the copper coinage they contained. The person charged in the present instance was William Holden, a youth of seventeen; and he was accused of robbing a Mr. Taylor, who keeps a lodging-house in Albany Street. The evidence of the prosecutor was to the effect that he slept in the basement of the premises, and that at about three o'clock one morning he got out of bed; and, thinking that the supply of gas was running short, he went into the area and put twopence in the slot. Before falling asleep again, he heard footsteps in the area, and, going to see who it was, found prisoner and a man there. He seized prisoner and thrust him into the coal-cellar; and, while he was doing so, the man somehow escaped, although the depth of the area to the railings that guarded it was fully 7 feet. Seeing that one of two meters that were there had been broken open and the money-box taken out, he called a constable, and gave the prisoner into custody. The constable testified to having found that the patent padlock had been forced off one of the meters, and the money-holder taken out. It appeared that operations had been commenced on the other meter, for inserted in its padlock was an iron spike, with a piece of rag wrapped round one end of it to afford better holding in using it. The spike and the broken padlock were produced in Court, and a novelty in the way of burglarious implements in the shape of a long pair of leather driving-reins. It was by means of these that the descent was made into the area; one end being buckled to the railings at the top, making it easier for a person to climb down and up again. It appeared probable that the thieves had been successfully at "work" before they invaded Mr. Taylor's premises, since, although according to the prosecutor's calculations there could not have been more than about 4s. in the meter broken open, 8s. 2d. was found on Holden—all in penny pieces, and without a single halfpenny in the collection. Prisoner, who acknowledged his guilt, was remanded in order that the police might make inquiries.

At the Longton Borough Police Court last Saturday week, two boys—Harry Burgess and Frank Bedson, aged eleven and ten respectively—were charged with stealing money from prepayment gas-meters belonging to the Corporation Gas Committee. It was stated that the lads had entered four vacant houses by breaking the kitchen windows; and, having smashed the meters with bricks, robbed them of the money they contained. The accused were said to be beyond the control of their parents; and the Magistrates committed them to an industrial school until they attain the age of sixteen years.

MISCELLANEOUS NEWS.

SHEFFIELD UNITED GASLIGHT COMPANY.

The Half-Yearly Meeting of this Company was held last Tuesday—Sir Frederick T. Mappin, Bart., M.P., in the chair.

The General Manager and Secretary (Mr. Hanbury Thomas) read the notice of meeting; and the report and accounts—summarized in the "Journal" for Aug. 16 (p. 385)—were taken as read.

The Chairman, in moving their adoption, said they met, as usual, under very satisfactory circumstances, for although a reduction in the price of gas had been in force during the last three months of the half year, the Company had earned more than the customary dividend. The total net revenue was £41,421 14s. 2d.; and after allowing for dividends amounting to £41,335 3s. 6d., there was a balance of £86 10s. 8d. On the last occasion of their meeting, he stated that the reduction of 2d. per 1000 cubic feet which was then about to be made, would make a difference of something like £18,000 or £19,000 per annum; but the very satisfactory working and the increase in the sale of gas during the half year left the Company with a balance of £86 10s. 8d. over the usual dividend, instead of with a deficiency, as he and his colleagues had anticipated. The balance to carry forward for the present half year was £21,992 1s. 7d. During the last three months, the price of gas had been 1s. 6d., 1s. 8d., and 1s. 10d. per 1000 cubic feet. The reserve fund was at its maximum—£86,192 13s. The results of the half-year's working had been somewhat as follows: They had received more for gas by £1165; in the fitting department, £581 more; and sulphate of ammonia had realized £1871 more than during the corresponding half of the year 1897. On the other side, they had expended more for coals by £2099, having paid an advance of something like 4d. per ton on the purchases for the past twelve months; salaries showed an increase of £1439, including the bonus of 10 per cent. which the Company gave to the staff on all occasions when the gas had been lower than it had been supplied at previously. They had received £910 less for tar; and the repairs of mains had cost more by £987. The dividends were more by £1560; and after allowing for all these increases or decreases of payments and receipts, there was, as he had said, a balance of earnings over and above what was required for dividend at the usual rates. The quality of the gas had been fully maintained; and 876 tests showed an average of 17·79-candle power. The gas sold during the last six months had been 1105 million cubic feet, an increase of 50 millions. This was evidence, he thought, that the Board did not decide to build new works at Grimesthorpe before it was time to do so. The leakage had been 44½ millions, equal to 3·87 per cent., which was rather less, perhaps, because the state of some of the meters had been taken a day earlier or later than usual. During the six months 39 additional gas-engines had been fixed; they had sold 357 gas-fires and 393 boiling and other stoves; and 49 additional cooking-stoves had been let on hire. The gas-engines in 1892 consumed 33½ million cubic feet in the year; but in the last twelve months this had increased to 100½ million cubic feet. The growth thus indicated in the use of gas-engines would, he thought, continue, and at a still greater rate as the citizens found out the advantage and economy of using these machines. Gas-engines gave far less trouble, and he believed that for ordinary work they were far more economical, than any other mode of obtaining power. The capital expenditure of the Company had now been £823,814 19s. 2d.; and they had expended during the past half year £31,440 6s. 11d. The large works the Company had been erecting during the last two years at Grimesthorpe were now approaching completion; and the expenditure was very heavy, as the Board had discovered by the cheques they had had to draw that morning. They hoped in a few weeks that they would be making gas at Grimesthorpe; and when this was accomplished any anxiety the Board might have felt as to the coming winter would be removed. It was their duty to be prepared for all weathers, and for any demand that might be made upon them by the inhabitants of Sheffield; and he thought he could say they had fulfilled it. The number of consumers was now 54,757; and of meters fixed, 55,709. They had 426 miles of mains laid, from 2 inches to 4 feet in diameter. During July and August, the gas they had sent out showed an increase of 21,974,000 cubic feet over the quantity for the same months of 1897—an increase equal to 9·9 per cent. Some of the shareholders would no doubt have noticed the incandescent burners now being fixed in the large lamps in the principal streets of the city. Each burner gave a light equal to from 80 to 90 sperm candles, and consumed only 4 cubic feet of gas per hour. The lamps had four burners each, giving a light equal to 350 candles, and consuming 16 cubic feet of gas per hour, which cost only 0·28d.; so that each of these large lamps with four incandescent burners, burning 3½ hours, would cost the Corporation only 1d. After midnight the arrangement was that only one burner was to remain lighted; and for the remainder of the night, accordingly, only one burner was consuming gas, and giving something like 80-candle power light. This one light could burn for 14 hours for 1d. Surely it could not be gainsaid that gas had come to benefit the whole community, when a beautiful light like that he had described could be supplied in the streets of the city for such a small price—a price which he thought nothing in future could excel. No chimneys were necessary for these improved burners; and so far as the Company's experience went, they found that four or five mantles per burner a year were all that were required for these street-lamps with the new burners. The light was increased four-fold; and he thought all who had seen it would agree that he was not exaggerating its advantages in what he had said. A short time ago he saw the following article in one of the Sheffield journals: "Then companies work for dividends, but municipalities have no dividends to consider; they work for the common weal, and they work under vigilant observation. We know of no one instance in which the transference of gas-works from trading companies to the municipal authorities has not been to the marked gain and the unchallenged satisfaction of the community in which the change has taken place. If anyone knows of a case to the contrary, we invite him to name it." Well, as Chairman of the Sheffield Gas Company, he thought he was entitled to say something upon this subject. The other day he read in the "Journal of Gas Lighting" a short extract from the "Birmingham Daily Post;" and it stated that the price of gas was last reduced in Birmingham in 1884, to 2s. 7d., 2s. 5d., and 2s. 3d. per 1000 cubic feet, subject to 5 per cent. discount, and that from July 1 this year a reduction of 1d. per 1000 cubic feet is being made. The quality of the Birmingham gas was last year 17·21 candles, whereas the Sheffield gas was 17·77 candles. Nottingham gas was 18·97 candles—rather more than 1-candle power better than Sheffield. The Corporation of Birmingham purchased the gas undertaking there in 1875; and the Nottingham Corporation purchased theirs in 1874. In the "Journal of Gas Lighting" of Aug. 30, it stated that there had been practically no change in the price of gas at Nottingham since 1882, when it was fixed at 2s. 6d. and 2s. 4d. per 1000 cubic feet, at which figures it still remained. In 1883, the Sheffield Gas Company's charges were 2s. 4d., 2s. 2d., and 2s. per 1000 cubic feet; the prices now charged were 1s. 10d., 1s. 8d., and 1s. 6d.—a reduction of 6d. per 1000 cubic feet to both small and large consumers. Sixpence per 1000 cubic feet, calculated on the present consumption of gas in Sheffield, amounted to £56,000 per annum; but it must be borne in mind that the gas sold in Birmingham was more than double the quantity of that sold in Sheffield. This 6d. per 1000 cubic feet, on the quantity sold in Birmingham in 1897, amounted to £125,446, which was the amount the consumers of gas in that city had to pay in excess of what they would have had to pay had the same reductions been made in Birmingham as in Sheffield. It was true that in 1897 £54,336 was appropriated in aid of the rates; but this sum was a tax which consumers of gas had to pay, in addition to the usual rates and taxes. It was therefore apparent that Sheffield gas consumers had been more fortunate in deriving their gas supply from a company than the consumers in other large towns where the works were in the hands of the corporation. He maintained that cheap gas must certainly be a very considerable advantage to the manufacturers and working classes of the town. He had thought it his duty to say something upon this subject, as continual remarks—and not friendly remarks or fair criticisms—were being made about the Company, and one could not help replying to them when the opportunity occurred. They would all remember that in 1869 the Sheffield Corporation had a Bill in Parliament to purchase the gas undertaking; and the Committee having heard the evidence in favour of the Bill, without asking the Sheffield Gas Company to make any reply, or to put in any evidence to answer the evidence given by the Corporation, rejected the Bill. During the hearing, before the Bill was rejected, the representatives of the Corporation offered to purchase the undertaking of the Company, and guarantee them 9 per cent. At that time the shareholders were receiving 10 per cent., and had continued doing so ever since; and he thought they were likely to get it in the future. It was not likely that the Directors would listen to any such proposal. Had there been liberal-minded men who knew something of the future, and looked to the progress of the city, they would have dealt with the Company in a very different way. Recently, during a short holiday at Folkestone, the weather was very hot; and the rooms he occupied were lighted by electricity. It was often said by the partizans of the electric light that there was no heat in it. His experience at the rooms in Folkestone told him something very different. In the sitting-room there were three electric lights; and the heat from them, in addition to the heat of the atmosphere, made the room unbearable. They had to turn off first one light and then another, and order candles to read by. In the bedroom it was the same; and as the two lights there were worked together, he had to have them both out and substitute candles before the air in the room was anything like bearable. There were gentlemen who spoke very highly of the light for its cleanliness, in which respect they said it was far superior to gas. He did not know that this was quite a correct statement, for even with the electric light they saw that the tops of the ceilings where it was used were blackened pretty much the same as when gas was used. The great thing was to have a better atmosphere. Whether they had gas or electric light, the heat drove the smoke and grime of the atmosphere to the top of the ceiling and on to the walls of the rooms; and they could depend upon it that heat was one great cause of this. At the Sheffield Club in Norfolk Street, it was said, when the electric light was adopted six or seven years ago, that the premises would no longer present the same dirty appearance. Nevertheless the walls had been washed and scraped every year since that time; and in the seventh year it had become necessary to repaint the whole of the premises. He maintained that this necessity had not arisen either because of the electric light or of the gas light, but because of our shockingly dirty atmosphere. In conclusion, he referred to the remarks he made at the previous meeting about the shopkeepers of the city taking advantage of the cheap gas, and not closing up the windows of their places of business on holidays or early days. He still thought it would be a very wise thing for the shopkeepers of all large cities to spend some time and some little money upon the arrangements of their gas apparatus, so as to give a beautiful light and display their goods to advantage. In his opinion, it was as cheap a kind of advertisement as they could have. He did not know that he had anything further to say, except that, as usual, he believed the gas undertaking was as healthy, and, indeed, in as prosperous a condition, as at any time since he had been associated with it.

Mr. Ebenezer Hall seconded the motion, and it was carried without any discussion.

Mr. John Wilson again urged the Board to abolish or materially reduce the rental charged for the meters of small consumers. At the same time he expressed his belief that the Company was "one of the best companies in the universe;" and he styled himself one of the oldest gas consumers in Sheffield, having used it for 57 years. At the beginning of that long period it cost him 8s. 4d. per 1000 cubic feet, and now it was only 1s. 10d.

The Chairman promised that the Directors would bear Mr. Wilson's advice in mind; but he could make no rash promise that they would accede to his request. Answering an inquiry as to the applicability of the new incandescent burners for household uses, Sir Frederick said the new type of burner would certainly be applicable. The demand for the burners was so great at the present time that the Company had not been able to secure all they wanted, even for the streets. Very shortly he hoped to try the new burners in his own house.

The retiring Directors (Sir Frederick Mappin, Dr. Sorby, and Mr. T. H. Waterhouse) were then re-elected; and a vote of thanks to Sir Frederick for presiding concluded the proceedings.

THE PRICE OF GAS AT SWANSEA.

Purchase of the Gas Company's Works Suggested.

A passage from the speech of Sir Frederick Mappin at last week's meeting of the Sheffield Gas Company, in which he referred to the charges for gas in Sheffield and Birmingham, suggested to "The Cambrian" that the consumers of Swansea were paying far too much for their supply; and so in Friday's issue an attempt was made to incite the ratepayers to make "a strong effort to remedy this condition of things." Our contemporary points out the direction in which it considers this could be done, when it asks, Would it not be advisable to purchase the gas-works, so that the public might receive a portion of the large profits now realized? The article then proceeds. "It has occurred to many intelligent and influential burgesses that the Corporation should make an attempt either to secure the gas-works, or effect a reduction in the price of gas. For the purposes of comparison, we give the following table:—

	Popu'ation.	Cost of Gas.		Population.	Cost of Gas.
Sunderland .	142,107	1s. 11d.	Bury . . .	60,000	2s. 1d.
York . . .	72,000	1 11	Salford . .	213,190	2 1½
Newcastle .	217,222	1 7½	Sheffield . .	351,848	2 0
Plymouth. .	98 000	1 9	Swansea . .	100,000	3 0

What does this statement prove? It proves that gas is sold cheaper in towns which are not so favourably situated as Swansea in regard to the coal-fields. We are almost in the midst of the richest coal-field in the world. Even for oil, which now plays so important a part in the economical manufacture of gas, Swansea also has a distinct advantage. Then how comes it that we have to pay so much for gas? Swansea possesses one of the best works and most capable Managers in the kingdom. It is this knowledge which makes the question the more inexplicable. Now, let us assume for a moment that the gas-works were public property, as at Birmingham. We do not know to what extent £54,000 would relieve the rates of the great Midland city. In Swansea such a sum would relieve the rates to the extent of about 3s. 6d. in the pound. We do not think for a moment that so huge a profit would be secured; but suppose we put it down at £10,000. Now £10,000 would mean a saving to the ratepayers of a 9d. rate! Thus it will be seen that Swansea is losing very considerably every year consequent upon the gas-works being private property. The works are worth buying. They are in good order, and possess a large surplus of gas-making power. The capital is not, we think, excessive. What the Company demand we do not know. Were they to ask that the dividends be capitalized by the 3½ per cent. tables, and for a fair sum as compensation to the Directors and Manager, the Corporation might well enter into negotiations. That was the opinion of Mr. George Livesey in 1885. He also gave it as his opinion that there is no power to compel the Company to sell; that it is not at all likely that such power would be granted by Parliament; and that the longer purchase is delayed the higher will be the price asked. But whether it be deemed advisable to purchase the works or not, we certainly think it the duty of the Corporation to do what is necessary to secure a reduction in the price of gas. What can be done at Plymouth and other places ought to be done at Swansea."

THE GAS QUESTION AT SOUTHPORT.

Mr. Corbet Woodall Selected to Investigate the Working.

At the Monthly Meeting of the Southport Town Council last Tuesday, the Gas Committee submitted minutes in which they recommended the appointment of Mr. Corbet Woodall to examine into, and report upon, the working of the gas undertaking. Although the proposal was in compliance with a resolution passed by the Council at the previous meeting, it gave rise to a protracted debate.

The Town Clerk (Dr. J. Davies Williams), at the outset, submitted communications from two members of the Gas Committee, Aldermen Fisher and Rimmer, tendering their resignations as members of the Committee.

It was decided that the letters should be deferred until the minutes of the Committee had been considered.

Mr. Dimond then moved the adoption of the minutes of the Committee. He referred to the fact that they had appointed an expert, and said that the returns showed an increase in the sale of gas of above 10 million cubic feet for the previous four months. Gas had been largely used in gas-cookers, which were becoming very popular in the town; and the Committee were still selling a large number of them.

Mr. Rhodes seconded the motion.

Mr. Austin, referring to the clause in the minutes—"That Mr. Corbet Woodall be engaged to report on the gas estate, with instructions to recommend to the Committee any improvements which in his opinion would be likely to result in an increased profit"—thought the Gas Committee had been wise in passing this resolution; but he would like to point out that, if it was adopted by the Council, it would only partially solve the problem of transforming an unsuccessful undertaking into a prosperous business concern. On analyzing the expenditure for the past financial year, he arrived at the following figures. They were not absolutely correct; but for all practical purposes to prove his argument they were as good as correct. The fixed charge was £6687; the working expenses, £19,154; and the cost of materials, £20,497. It was altogether improbable that Mr. Woodall would be able to offer any suggestion to the Committee which would enable them to reduce the fixed charges. What he would be able to do would be to point out how the working expenses might be largely economized. He was astonished to see that, at a meeting of the Council held in August, an Alderman stated that, if he could have his way, there would be twenty-five more men employed at the gas-works, even though he admitted that one means of cheapening the price of gas and increasing the profit was to reduce manual and extend mechanical labour. He also stated that the Committee had never made improvements at the expense of labour, and that, if an expert was called in, and his advice followed, they would have to discharge a lot of men. This was to him (the speaker) most astonishing. No wonder that the price of gas in Southport was so high, and the profit so small. He said this policy must be reversed. There must be manifold reforms, or they must give up all hope of ever producing results in the gas undertaking which would compare satisfactorily with other well-managed companies and corporations. As to the cost of materials, the expert would not be able to help them one iota. It was a matter which should be undertaken by the Committee. The goods should not be ordered from the Manager's office. They should be bought in the best and cheapest market by public tender. On the Gas Committee, they had the cream of the Council; but judging by the miserable profit of £6716, and judging by the admissions of one of the most eminent supporters of the policy which had obtained in the past, he could not help but think that they had not been acting on the best lines. In selecting a tender, the first thing was to choose a man who could do the work or supply the articles required satisfactorily and well. The tenders need not be confined to Southport. They must not be restricted by wretched parochialism; but the contracts should be given to the people who could best perform them. If the only consideration in view was to look after the general interests of the ratepayers, and not of any particular class, if they would do so careless of Nov. 1, the price of gas would be materially reduced, and the amount of profit would be largely increased.

Mr. Holland agreed with the Committee in recommending the appointment of an expert; but he did not think they had got the right man. He wanted the most practical man they could get, and one who had proved up to the hilt that he was so. He believed Mr. Isaac Carr, of Widnes, was that man. It was insinuated, when Widnes was mentioned a month ago, that there was some by-play going on—that possibly they were turning out an inferior gas for use in the daytime, and a gas of fairly good quality at night, by means of which they were able to sell at 1s. 4d. per 1000 cubic feet. He happened to know that Widnes gas was of 18¼-candle power, and very little was supplied in the daytime. The system of buying material, and the mode of procedure, was entirely different from that of Southport. Widnes took the lead of all gas-works in the country, and that was the place where they ought to seek information. A deputation from the Gas Committee had been to Widnes; and he thought he had something to do with them going there. He believed the Manager of the Widnes works would be only too pleased to come and give them information as to gas making, which he had made his hobby. He would come down for a small sum, and put them in the right way. Gas experts generally encouraged a lot of new buildings and other expenditure; but, with Mr. Austin, he believed that a great deal depended upon the articles they purchased, and the way they manipulated them. They had not worked on the best principle in the past; they had gone on with brick retorts instead of clay retorts, such as were used at nine out of every ten works in the country. It was a fallacious argument to say that the remodelling of their works would do away with a certain amount of labour; an increased output would mean increased profit, and increased labour. He would like to see Mr. Austin made Chairman of the Gas Committee. He thought it was no use shirking anything—what they wanted was a new Gas Manager.

The Mayor: There is nothing on the minutes about that.

Mr. Holland said it was a question of management, and he thought that affected the Manager. If he had a manager who did not succeed in two, three, four, or five years, he would very soon get a fresh one. He would move as an amendment, that the minute as to the appointment of Mr. Corbet Woodall as an expert be referred back to the Committee, and that Mr. Carr be invited to give them the benefit of his experience.

Alderman Griffiths remarked that, at the last Council meeting, there were many disclaimers as to the intention of members to attack the members of the existing Gas Committee. The minutes now before them carried out the resolution of the Council to the letter; and the Committee had resolved that Mr. Woodall should be the expert to be engaged. Mr. Woodall was known as one of the best experts in the gas world; Mr. Carr was not so known. He was known as a Gas Engineer; and if the gentlemen who had already spoken had known what they wanted, they should have embodied the name of Mr. Carr in the resolution previously brought before the Council, and not have again attacked a Committee who were trying to carry out their instructions. He did not think there was another gas-works in the United Kingdom that had adopted Mr. Carr's methods of manufacture and distribution. That being a fact, why should Mr. Carr be employed as a gas expert for the Southport Corporation? Mr. Austin had said that they had an unsuccessful venture. He replied that they had nothing of the kind. There were very few gas-works which were so successful as the Southport. That they could be improved, and improved rapidly, he had no doubt. They had a Gas Manager who made a great mistake in that he had not the faculty of explaining everything to his Committees. That he understood gas making he (Alderman Griffiths) believed, and that he could hold his own with any gas manager who could be brought against him. As to Mr. Austin's remarks, he (the speaker) mentioned at the last meeting that the rates need only have been raised 3d. instead of 5d., and that they might have had an increased profit upon gas which would have saved a twopenny rate. But in consequence of the "pushing" of the electric light, they had to decrease the make of gas; and this resulted in at least twenty-five fewer men being employed. The endeavour of the Committee had been to give gas second to none; and he appealed to the Council, instead of carping at and criticizing the Committee, to support them in their endeavour to do what they could to provide gas of the best quality at as low a rate as possible. He would be in favour of engaging two experts, or even more, if the Council thought it necessary; but in the meantime he appealed to them to back up the Committee in their present efforts.

Mr. Threlfall said he was prepared to give all the members of the Council credit for not having the slightest desire to adversely affect the position of the gas workers. What he wished to ask was: Would the inquiry by the expert be an independent one, or would the Gas Manager have to instruct the expert? If the latter, he did not believe any good would come of the inquiry. Taking the results of the gas undertaking for a number of years, it was found that, while the amount of gas made was greater, the profits were less. In his opinion, the Manager started wrongly in the matter of retorts. That was, he commenced with brick instead of clay. [Mr. Holland: He changed them.] If the Manager made that mistake, and found that his system was wrong, he should frankly say so. Then he (Mr. Threlfall) would say that no man was infallible, and would have the matter rectified. He left the Gas Committee because he could not get any answers to his questions.

Mr. HULME hoped the Council would support the Gas Committee as far as they could in the matter of the expert.

Dr. WEAVER said, as the original mover of the resolution, he was quite satisfied with the expert who had been chosen. He was pleased the undertaking was now showing a great improvement; and if it was maintained, there would be £3000 or £4000 more profit at the end of the year than there had been in previous years. He considered that the chief loss on the works had been in regard to the management; and they must improve the works in that direction if they wanted to make a profit.

Mr. IRVING supported the minutes of the Committee. They were exercising a considerable amount of care; but there had been laxity in the past, and the Council were anxious to support them in everything they did with a view to improving the working.

After further discussion,

Mr. HESFORD suggested that if the Manager was given a holiday while the expert was in the works, the result would be more satisfactory to the Council.

Mr. DIMOND, replying on the discussion, said it would be for the expert to see he had a free hand; and a gentleman of Mr. Woodall's position would certainly not be unduly influenced one way or another. If the report of the expert was not satisfactory, they would have the power to recommend the appointment of another. He did not think that their works were in a bad condition. They were improving their position. With the exception of two years, when they charged a higher price for gas, the profit made last year on the works was above the average of the last eight years, although it was explained that they had lost considerably through the introduction of electricity. The undertaking, he felt convinced, would give an excellent account of itself by the end of the year.

The minutes were then put and carried.

Alderman GRIFFITHS afterwards moved: "That from the 30th of September next the wages of the employees of the Highway and Gas Departments shall be raised to the rate now obtaining under the Health and Parks Committee." He added that he wanted the wages of the various departments placed on all-fours. It would affect 50 men in the Gas Department.

After a short conversation, it was decided to refer the proposal to the Highways and Gas Committees to report upon.

In last week's issue, a paragraph was published bearing on the matters dealt with in the foregoing report, which paragraph in two respects was not strictly accurate. We learn that the reported improved results were not due to the use of "clay" retorts, as there is not a single one on the works. The fact is that, owing to a retort-furnace devised by Mr. John Booth, the Engineer and Manager, having now been perfected, better carbonizing results have been obtained for nearly twelve months past—not four months, as stated.

DOVER GASLIGHT COMPANY.

The Progress of the Concern.

The report and accounts of the above Company which were noticed in the "JOURNAL" for the 23rd ult. were submitted at the half-yearly meeting of the shareholders by the Chairman (Mr. Willsher Mannering). Commenting upon the favourable character of the statements, he said the revenue for the six months was £16,612; and the expenditure £13,486. After paying the usual dividend, there would remain £426 to be carried forward. He congratulated the shareholders upon the eminently satisfactory increase in the growth of the Company's business, especially in the stove department. The quantity of gas sold was 5 million cubic feet more than in the corresponding half of 1897, or an increase of 5·9 per cent. At the end of June, there were 971 cooking and heating stoves on hire, against 801 at the same time last year. The meters in use were 3008, compared with 2788; and the number of consumers was 2715, against 2530. To meet capital requirements, for extension of the plant and mains, 150 new shares were sold by auction at the end of March, and produced about £2847, or an average of £18 19s. 6d. per £10 share. This good price had enabled them to raise the money at a fraction under 4 per cent. At the previous sale of shares in 1890, the average price was only £16 11s. 2d. The expenditure on capital account had been: £1690 in the completion of the new retort-house; £600 in extensions of mains; £700 in stoves; and £300 in meters. The prosperity of the Company had permitted of a reduction of 1d. per 1000 cubic feet in the price of gas. This would have been 2d. but for the rise in the cost of coal. In the renewal of the coal contracts for the ensuing year, they had had to pay an advance of 1s. per ton; and this would entail an additional charge of about £900. The penny reduction would represent a saving of £750 a year to the consumers. No alteration had been made in the price of gas since 1894, when it was lowered to 2s. 6d. per 1000 cubic feet; and in the first half of the year the output was just under 82 million cubic feet. During the past half year, it was nearly 91 millions. The Directors, too, had not been unmindful of the workmen. The men engaged in the manufacturing department had had their wages increased; and the fitters, mechanics and yardmen now ceased work at an earlier hour on Saturdays. He was pleased to add that the officers, as well as the men, continued to render loyal and efficient service. The report was adopted, and a dividend was declared at the rate of 7½ per cent per annum.

Water Charges at Halifax.—Some resolutions passed by the Halifax Corporation Water Committee, and confirmed by the Town Council at their last meeting, are worthy of notice. It has been agreed that, from March 31 next, one water closet and one bath in each dwelling-house shall be supplied with water free of charge. For each additional closet or bath, where the house is under the annual rental of £20, the charge is to be 5s. each; and where the rental is over £20, 7s. 6d. each. No charge is to be made for service-pipes to dwelling-houses; and water for warming apparatus in churches and chapels is to be supplied free.

THE PRICE OF GAS AT LEEDS.

A Reduction to Two Shillings Decided Upon.

The proposal to reduce the price of gas was further considered by the Gas Committee of the Leeds Corporation at their meeting last Thursday. The Chairman (Mr. Lowden) moved that the price be reduced by 2d. to 2s. per 1000 cubic feet; the concession to take effect from Jan. 1 next. He remarked that, when the question of the reduction in price was brought before the Council some time ago, he opposed it for several reasons. The Committee had not then made their coal contracts in their entirety for the year; and there was an apprehension that there might be trouble with the miners in regard to wages. At that time, also, there was uncertainty as to what their income would be from residuals. He then stated that he considered the time was inopportune; but he made a promise that he would take the earliest opportunity of proposing a reduction in price. The views which he then held as to the probable amount of the reduction had been considerably altered by the report for the half year ended June 30 last, which had been placed in his hands by the City Accountant. From it he found that the profits had been unprecedentedly large. They had reached £20,702. Sinking fund charges amounted to £6064; leaving a surplus profit of £14,638. Compared with the corresponding six months of last year, the figures were as follows: Profits, £8059; and sinking fund charges, £6436—leaving a surplus profit of £1623. The price of gas during these two periods had been exactly the same. He pointed out that the first six months formed the worst profit-making half of the year, owing to the fact that the consumption of gas in the second three months was less than in any other quarter of the year. He also alluded to the fact that, during this quiet time, an opportunity had to be taken to make the necessary repairs for the year, the cost of which had to be set against the profits of the half year. One of the causes which had led to the larger profits was the increasing favour shown to gas-cookers, a considerable number of which were in use; and penny-in-the-slot meters had also proved very beneficial to the revenue. Then there had been a great increase in the make of gas per ton of coal carbonized, which resulted in a large addition to the profits. For instance, the gas made during the last month, compared with the corresponding month of last year, had increased by nearly 1000 cubic feet per ton. The contracts for coal had been entered into for the next twelve months at prices which were practically the same as those of the year which had just ended. As regarded the application by the miners for an advance of wages, there was a probability that it would be settled without any friction. The prices obtained for residuals were very much better than those received last year, particularly for ammoniacal liquor and coke. Referring to the new installation of inclined retorts, which would be in operation shortly at the Meadow Lane works, the Chairman stated that this was not for the purpose of supplanting the old hand-stoked retorts, but was to supplement the output of gas, owing to the rapidly increasing demand. The plant would make 2¾ million cubic feet of gas per day; and gas would be produced at a price which would yield a larger profit than was obtained from the hand-stoked retorts. One reason why the Committee in the future anticipated an increased demand for gas was that they were taking steps not only to provide mains for districts which hitherto had none, but they were also increasing the capacity of the mains in many districts where, at the present time, they were insufficient. One advantage of the reform in the pipe-laying department was a reduction in the leakage; and though the reform had not existed for any length of time, the leakage for the whole year was found to be ½ per cent. less than in the previous year, which, of course, also meant additional profit. The proposed reduction of 2d. per 1000 cubic feet would entail a decrease of revenue of £21,000 per annum; but considering that the price would only be 2s. per 1000 cubic feet, that no charge was made for meter-rents, and that 5 per cent. was allowed for prompt payment of accounts, the net price of the gas supplied by the Committee—taking into account its quality, which was more than fully maintained—would perhaps be the cheapest in the kingdom. The resolution was unanimously adopted, and will be brought before the Council for confirmation.

BRADFORD CORPORATION GAS AND ELECTRICITY SUPPLY.

The Half-Yearly Statement of Accounts.

The Meeting last Tuesday of the Bradford City Council afforded an opportunity for the Mayor (Mr. Thomas Speight), in his capacity of Chairman of the Gas and Electricity Supply Committee, to make his usual half-yearly statement as to the accounts of the two departments as they were at June 30.

During the six months, he said, 76,562 tons of coal and cannel were carbonized. The gas produced amounted to 798,170,000 cubic feet (being a decrease of 2·51 per cent. on the corresponding period of 1897), and 31,889 tons of saleable coke, 4863 tons of tar, and 11,026 tons of ammoniacal liquor were made. The average cost per ton of the coal and cannel used was 10s. 0·96d., as against 9s. 11·53d. last year. Coke realized 2s. 6·36d. per ton of coal this year and 2s. 5·98d. in 1897; but owing to the continued fall in the value of tar and its products, which he anticipated last year, the return for tar only amounted to 1s. 3·38d. per ton of coal, instead of 1s. 8·12d., the price obtained last year. The revenue account for the half year showed that coal and cannel cost £39,312, or £599 less than in 1897; purification cost £1251, or £158 less; salaries were £560; stokers' wages amounted to £10,220, or £171 less; repairs and maintenance of works and plant (except retorts) cost £3484, or £1379 less than in the corresponding half of 1897, when new scrubbers and condensers were put in at the Thornton Road works; repairs to retorts cost £2671, or £105 more; and repairs and renewals of street mains and services absorbed £2622, being an increase of £411 this year. After detailing other trifling variations in the items of expenditure between this and last year, he proceeded: On the other side of the accounts the revenue from the sale of gas was £74,932, being a decrease of £1645. This was, of course, due to over 2 per cent. less gas having been sold this year, caused by the mild winter, bad trade, the extension of the system of incandescent gas lighting, and also to some extent by the progress of electricity in the city. He

however, thought that this latter item would be "very slight." The hire of meters realized £316, or £6 less than last year. Coke produced £7973, or £102 less; while tar, which last year brought in £6570, this year had only yielded £4909, or a decrease of £1661, which was entirely caused by the depreciation in the values of tar products already referred to. The revenue from chemicals amounted to £7249, which was an increase of £1320. The total revenue for the half year amounted to £98,426, and the total expenditure to £75,311; leaving a gross profit of £23,333, or £81 more than in the corresponding half of 1897. From this gross profit interest on loans took £8659; bank interest was £218; income-tax was £955, and the sinking fund absorbed £4597. This left a net profit for the half year of £8902, or £414 less, which was very satisfactory, considering the reduction in the quantity of gas sold and the depreciation in tar. In addition to this there was the lighting of the streets, which was done by the Gas Department without charge. On capital account during the half year there had been expended for new mains in new streets a sum of £845; new stoves and cookers, £250; and £101 for land at the Thornton Road works. The total capital expenditure up to June 30 was £632,015, of which £146,671 had now been repaid through the sinking fund.

Turning to the Electricity Department, the Mayor said that heavy expenditure had been incurred; and the proceeds were possibly not quite so large as was at one time anticipated. The total receipts for the half year ended June last were £9565, as compared with a sum in the corresponding period of the previous year of £8726, or an increased income of £839. The total expenditure for the half year, which included interest and sinking fund, was £7907, as against £7061 for the corresponding period. The profit for the half year was therefore £1658, against £1665, being a very slight decrease on the similar period of last year. The number of consumers at present was 720, against 521, or an increase on the corresponding half of 38 per cent. The total units consumed was 480,294, against 443,288, or an increase of 8·33 per cent., irrespective of current supplied for public arc lamps, upon which there was no return. The total profits from the opening of the electricity works in September, 1889, to June, 1898, after paying interest and sinking fund, amounted to £18,391; and the total amount written off for depreciation had been £7307. This left the sum of £11,083 to be appropriated as the Council directed. The trade profit (the profit before charging interest and sinking fund) was £3 4s. 9¼d. per cent. for the half year on the capital outlay of £168,506. The net profit (after charging interest and sinking fund) showed 18s. 7d. per cent. for the half year. Taking the June and December half years together, the trade profit was £11,784, representing £7 16s. 7d. per cent. per annum on the capital outlay. Of course it should be taken into consideration that the consumers had been receiving their incandescent lamps free, which practically amounted to a reduction in the price of current. If the desires of some members of the Committee had prevailed, it was certain that, instead of even a small profit of 18s. 7d. per cent., the balance-sheet would positively have shown a loss. The Corporation could scarcely expect to go on spending money at the rate they had been doing and to receive an immediate return; and altogether he thought that if the Council took every circumstance into consideration they would regard the statement as fairly satisfactory.

The minutes were adopted.

IMPURE GAS AT PORTSMOUTH.

Proposed Prosecution of the Portsea Island Gas Company.

We recently referred to the serious trouble in Portsmouth owing to the gas supplied by the above-named Company being charged with an excessive amount of ammonia; and the subject last Tuesday produced a heated debate at the meeting of the Town Council. The Finance Committee reported the communications which had passed between the Committee and the Directors of the Company; and, while the latter fully admitted their liability to penalty, they explained that the trouble arose from the neglect of an employee who had since left their service.

Alderman T. Scott Foster said the Committee felt it only right to now leave the matter in the hands of the Council. The limit of ammonia allowed in the gas was 4 grains per 100 cubic feet; but the tests by their Inspector gave the following results: Aug. 23, 15·9 grains; 24, 17·44; 25, 19·1; 26, 20·0; 29, 16·85; 30, 16·02; 31, 14·3; Sept. 1, 15·1; 2, 13·9; 3, 13·6; 4, 13·0; 5, 13·55; 6, 12·2; 7, 11·8; 8, 10·3; 9, 11·2; 10, 8·0; 11, 9·4; 12, 10·0. There had been no excess of ammonia in the Portsmouth gas, it was fair to say, for 15 years. The Directors had had an expert down, with the result that some thousands of pounds would have to be expended to remedy defects. As to the injurious effects of excessive ammonia in gas in living rooms, their Medical Officer had reported to them that, unless it was sulphurous ammonia, it would not injure health, but it would stain and tarnish articles of furniture.

Alderman Sir W. Pink moved that, unless the existing excess of ammonia were reduced within a month to its normal condition, a prosecution should ensue.

Mr. Blessley seconded this proposal.

Mr. Murtough said that, if such an adulteration had been found to exist in any other article, a prosecution would have followed *instanter*. They should not, therefore, allow a rich Company like this to impose upon the poor. The Directors had had plenty of time to ensure the supply of pure gas; but they had not done it, though they ought to have let off every foot of the vitiated gas. He moved that a prosecution should be instituted at once.

Mr. Emmett seconded the amendment; pointing out that they ought to be consistent, for in the very next clause of their report the Committee recommended the prosecution of several poor coal hawkers.

Alderman Scott Foster said that in one case the cause was accidental; in the other, it was wilful and deliberate.

Alderman Sir W. D. King (a Director of the Gas Company) offered to explain; but he was stopped by the Mayor under the Standing Orders. Alderman King, however, admitted that the complaint was a just one.

After further discussion, the first proposal was negatived by 18 votes to 12, and the amendment by 25 votes to 11. The report, which was then adopted, leaves the matter *in statu quo*, to watch whether the Company will get the gas to its normal purity.

CARLISLE CORPORATION GAS SUPPLY.

The Annual Accounts.

In the "Journal" for the 23rd ult., we gave a few particulars as to the results of the trading of the Carlisle Corporation Gas Department for the twelve months ended June 30; and further information is now available from the report of the Corporation Gas Committee just presented to the City Council.

From this it appears that the quantity of gas made during the year was 282,278,000 cubic feet, an increase of 6,739,000 cubic feet—equal to 2·4 per cent.—over the preceding year, when the quantity made was 275,539,000 cubic feet. Coal cost £1292 more than in the previous year; and the contracts for the current year show a still further increase. The gross profit for the year amounts to £9089; and after deduction of income-tax and other charges, there remains a sum of £8198 to be paid into the city fund. The payments out of the city fund on account of gas-works loans were: One year's instalments of loans, £1233; and one year's interest, £817—leaving an available balance of £6148. This amount is somewhat larger than the available balance last year—notwithstanding the diminution of gross profit—owing to the repayment of the loan borrowed for the purchase of the works in 1850. Appended to the report is a table showing the amount of profit which the Gas Department has paid into the city fund for the relief of the rates during the five years 1894 to 1898. The gross amount paid into the city fund for the five years respectively (omitting shillings and pence) was £6213, £7325, £8148, £9098, and £8198; the amount of instalments of loans for the different years was £2156, £2459, £2459, £2459, and £1233; while the amount of interest on loans was £1017, £1026, £970, £882, and £817. The total amount payable for principal and interest was £3173, £3485, £3429, £3341, and £2050; the balance available being £3039, £3839, £4718, £5757, and £6147. The Engineer and Manager (Mr. C. B. Newton) reports that the works under his charge have been maintained in efficient condition during the year, and are now in good working order. During the twelve months 26,309 tons of coal and cannel were carbonized, producing 282,278,000 cubic feet of gas, and giving a yield of 10,729 cubic feet per ton. In the preceding year, 26,181 tons of coal and cannel were carbonized; and the quantity of gas produced was 275,539,000 cubic feet. The small increase (2·4 per cent.) is due to the remarkable mildness of the weather during the winter months. The numbers of consumers, based on the number of accounts, are: By ordinary meter, 6172; by prepayment meter, 2461—a total of 8633. In 1897, the figures were: By ordinary meter, 6464; by prepayment meter, 1986—or a total of 8450.

THE PROPOSED PURCHASE OF OUTLYING DISTRICT GAS-WORKS BY THE BRADFORD CORPORATION.

A Settlement of the Question Said to be in Sight.

One of the most startling items of business at last week's meeting of the Bradford Corporation, says the "Bradford Observer," was the decision of the Corporation to give to the Commissioner who is to conduct the inquiry into the extension scheme, and to the Local Government Board, assurances that the Corporation will apply for powers enabling them to compulsorily purchase the various gas-works from which communities intended to be included in the Greater Bradford scheme now obtain their supplies. This means, of course, the expenditure of very large sums of money; for three pretty considerable undertakings, at any rate, would have to be purchased in order to do justice not only to the new citizens, but also to some—such as those at Heaton and Allerton and part of Frizinghall—who have been in the city for years, but have not been of it so far as the matter of gas charges is concerned. Complaints from the small communities added to Bradford in 1882, and subsequently, have been loud and long and frequent; but the Directors of the Gas Companies, knowing a good thing when they saw it, have not been amenable to what the Bradford authorities would consider to be reasonableness, and there has been no mitigation of the trouble. Now the Corporation find that the bitter lament of the enforced customers of the Gas Companies has been heard far and wide among their neighbours immediately across the boundary, who, in response to Bradford's invitation to come into the city, say that if they cannot get a reduction in the price of gas to the Bradford figure a large part of the possible inducement to them disappears.

The justification for the above statement appears in the course of a speech made by Mr. H. B. Ratcliffe, the Chairman of the Finance and General Purposes Committee. The minutes presented by the Committee stated that a resolution had been passed authorizing the Parliamentary Committee to give an assurance to the Local Government Board that, in the event of Shipley being annexed to Bradford (as proposed by the city extension scheme) the Corporation would apply for powers for the compulsory purchase of the undertaking of the Shipley Gas Company, in the event of their being unable to purchase by agreement. Mr. Ratcliffe said that the latter resolution had been altered so as to extend the assurance to the Local Government Board and "to cover all gas companies supplying gas in any district which might be annexed to Bradford." It was necessary for him, he thought, to give a word or two of explanation in regard to this proposed assurance to the Local Government Board. The Extension Sub-Committee, in the course of their negotiations, were met on all hands by the same objection from the outside districts proposed to be included, that if they came into Bradford they would still fail to be in the same position as the inhabitants of Bradford with regard to the price of gas supplied to them. First of all it was intended that the resolution should not be carried any further than as it related to the position of Shipley; but the Sub-Committee were very strongly of opinion that the Corporation must face this question firmly and fearlessly once for all. Their choice was only between tinkering with the matter or dealing with it properly; and he thought there could be no doubt that the proper thing would be to offer assurances equally to all the outlying communities which it was proposed to include in the extended boundary. Those of the inhabitants who were already within the city, but were bound to take their gas from the companies referred to, would, of course, have their claims also met by this arrangement.

A NEW GASHOLDER FOR RAMSGATE.

A Visit of Inspection.

A new gasholder, which for some time past has been in course of construction at the Ramsgate Corporation Gas-Works, is now all but completed; and in a few days the final tests will be made. In response to an invitation of the Chairman of the Gas and Water Committee (Mr. C. J. Gwyn), there was a formal inspection of the holder last Wednesday by a party consisting of several members of the Corporation and the borough officials.

Some interesting statistics were supplied to the visitors by the Engineer (Mr. W. A. Valon), from which it appeared that in the construction of the tank the ground excavated was equal to 4500 cubic yards; the amount of concrete used being 1500 yards. The thickness of the main wall of the tank is 2 feet, with 4 feet piers under the columns; the wall of the dumpling, 1 foot; and the top of the dumpling, 6 inches. The depth of the tank to the top of the rest stones is 25 ft. 6 in.; the width of the channel 6 feet; and the depth 18 ft. 6 in. The weight of the holder is 200 tons; and that of the guide-framing, 130 tons. The diameter of the holder is 115 feet; and the total height, 75 feet. The structure has a total capacity of 783,400 cubic feet. The work of excavation was carried out by Corporation workmen under the direction of the Engineer; and so true was the circle described that, on being tested later, it was not found to vary above the thirteenth of an inch. The actual work of constructing the holder was put out to tender. The total cost of tank and holder in round figures is £10,000, or about the same as the cost of constructing the last gasholder some years ago, but with a capacity of half as much again.

Light refreshments were served in the gasholder, a brief toast list affording the opportunity for a little seasonable speech-making. Mr. Gwyn, as Chairman of the Committee, in an opening speech, said that, in asking the Corporation to expend money on such an undertaking as the new holder, he thought it was due to the members that they should have an opportunity of seeing exactly what they had got for their money. The Committee had been extremely fortunate in the cost of the construction of the tank, and also in the obtaining of a very favourable estimate for the holder; and he thought the Corporation would agree that the work had been most excellently carried out, and, considering its magnitude, with considerable speed. In concluding, he asked them to drink to the health of their Engineer. Mr. Valon, in reply, said that he had to thank the Chairman for the very kind way in which he had mentioned his name in connection with this rather important work. The Chairman had referred to the necessity of spending large sums of money from time to time, in order that they might keep up with the demands made upon them for gas. It was, of course, impossible without considerable expenditure of money to do so. There was nothing more interesting to note than the progress made in the Gas and Water Department since it had been under the Corporation. In conclusion, he thanked those present for the kind way they had received his health, and said that both he and his son, who would be associated with him in future, would do the utmost they could to earn the approbation of the Corporation. Among other toasts submitted was that of the health of the Chairman of the Committee; the hope being expressed that Mr. Gwyn would be connected with the Corporation as head of the Gas and Water Department for many years to come.

GAS-WORKS EXTENSIONS AT ROTHERHAM.

Opening Ceremony.

To cope with the rapidly increasing demands for gas at Rotherham, an extensive scheme of gas-works improvements is in course of being carried out to the instructions of the Corporation Gas Committee. The scheme for augmenting the productive capacity of the works will eventually entail an expenditure of about £30,000. Over a third of this sum has already been spent in the erection of a new retort-house, on the most approved system; and further contracts have been entered into for £14,000. Last winter the maximum daily make of gas was one million cubic feet, a total which the new retort-house as inaugurated last week will increase by 650,000 cubic feet per day. When the other additions have been effected, the total productive capacity of the works will reach some 2 million cubic feet per day. It is only expected that with these additions the gas-works will meet the requirements of the borough for the next eight years; and care has, therefore, been taken to secure a further site on what is known as the Phœnix Land. The present works have been erected on the old fair ground, and the road leading thereto has been enclosed for the purpose. The new house is fitted with inclined retorts and all the latest improvements for the automatic handling of coal and for the economical consumption of coke in the furnaces. After crushing, the coal is lifted by buckets on an endless chain worked by a gas-engine. From the elevator, which is 60 feet high, the coal is conveyed to the bunkers, each of which is capable of holding about 40 tons; and from thence it is dropped through shoots into the retorts. The coal is conveyed to the retorts without being touched by hand in any way; the retorts being set at an angle of 32°. The cost of the retort-house as at present completed ranges up to £14,000; but so far the house is only half-filled. There are six benches of nine retorts in each bench; but the contracts have already been let for the setting of six more benches of nines. The production of gas in the new house will then be 1,300,000 cubic feet per day, and with the old retorts the total capacity of the works will be three millions.

The contractors for the brickwork were Messrs. Chadwick and Co., of Rotherham; and for the ironwork and retort settings, Messrs. R. & J. Dempster, of Manchester. Mr. George Winstanley, of Coventry, is the Consulting Engineer, and Mr. F. A. Winstanley is the Resident Engineer of the works.

The opening ceremony was performed by the Chairman of the Gas Committee (Mr. George Gummer), who—accompanied by Mr. G. Winstanley, Mr. F. A. Winstanley, Mr. J. W. Bellamy (the Secretary of the Gas Department), and some other officials—conducted the aldermen and councillors and representatives of the Rawmarsh and Greasbro' Urban District Councils, and several ex-members of the Rotherham Town Council, over the works, and explained the various processes which were then in operation, and the improvements carried out and in course of completion.

At a later stage of the proceedings an adjournment was made to the Council Hall, where luncheon was served. Among the invited guests who were unable to attend the function, were the Mayor and Town Clerk. The former wrote expressing regret at his absence, and paying a graceful compliment to Mr. Gummer in respect to the work that had been carried out under his chairmanship. He remarked that Mr. Gummer had mastered all the details of the works in such a way as, in his (the Mayor's) opinion, made him the best and most practical Chairman that the Council had yet had; and he hoped that Mr. Gummer would be long spared to occupy his present position. The Town Clerk also wrote. After expressing appreciation of the necessity for the gas extensions, and his regard for the energy, ability, and tact displayed by the Chairman, he went on to say: "I am aware that some criticism has taken place as to whether these extensions would be necessary on account of the intended electric installation; but experience elsewhere seems to show that the gas undertaking would not be likely to be materially prejudiced by electricity being provided by the borough. Perhaps I may venture shortly to refer to the Bill of the General Power Distributing Company, which has been passed by a Committee of the House of Lords, and will come before a Committee of the House of Commons in the ensuing parliamentary session, and which seeks to obtain powers to supply electricity within a radius of 25 miles of Warsop, in the county of Nottingham. The Bill is in direct violation of all legislation affecting electric lighting up to the present time, and, further, would curtail and impair the rights and powers of municipalities with respect to roads and other matters. However, I am not expressing my own opinion but that of the best experts of the country when I say that the Company, considering loss on transmission and other matters, even if their Bill became law, could not supply electricity as cheaply as could be done by a local installation. For various reasons, however, which need not be enumerated here, it is essential that the Bill should be stoutly opposed; and I am committing no breach of faith when I say that the opposition in the Commons from municipal public authorities will be a strenuous one."

After luncheon the toast of "Success to the Gas Undertaking" was proposed by Mr. I. Walker, who succeeded the first Chairman of the Gas Committee. In doing so, Mr. Walker took occasion to suggest that in time the price of gas to consumers should be reduced. He had, he said, always been in favour of doing this rather than making large profits for the relief of the rates. It was unfair to the consumers of gas that they should have to contribute towards the rates; and he was backed up in this opinion by a former Lord Justice of Appeal. The Chairman, in responding, pointed out that not only the Corporation and the consumers, but also the ratepayers, were interested in the gas-works, because their money was invested in the concern. Proceeding, he gave a history of the gas-works, and how the Corporation became possessed of them. The works were first established in 1833. The town was then of the size of a large village, with a considerable population; but there were only 101 consumers, and nearly as many public lamps—91. The price of gas was 10s. per 1000 cubic feet. The old Local Board effected what he believed was the first compulsory purchase of a gas-works in the country; and they assumed possession of the works in 1870. The borough was incorporated in 1871, when the Corporation undertook the management; and at that time the number of consumers, including the Rawmarsh district, was 1900. The make of gas was 58 million cubic feet per annum; and the price, 3s. to 3s. 3d. per 1000 cubic feet. He was sorry to say they had not decreased the price in proportion to the increased consumption. Having alluded to the presence of Mr. Goodwin, who had been connected with the gas-works almost since their inception, he mentioned that on the 10th inst. that gentleman completed 50 years of service at the gas-works. His (the Chairman's) first connection with the department was in 1887; and at that time he was struck with the small number of consumers—a little over 3000—as compared with the number of householders (8000) in the borough. He spoke of the changes made to induce householders to become consumers; the result being that they had now 8693 consumers, as compared with 3126 in 1888. In 1888 the make of gas was 135 million cubic feet, and in the present year it was 216 millions. He next dwelt on the necessity for the extensions. The Corporation were spending a considerable sum of money; but it was a wise investment, and the Gas Committee felt sure there would be a profit attaching to what had been done. They anticipated the total cost of the extensions would be over £30,000, for they would have to provide further accommodation for the storage of gas, land for which had been scheduled. Some people were rather afraid of the electric light and acetylene gas becoming popular; but he was of opinion there would still be a demand for coal gas. Wherever the electric light had been adopted, the consumption of coal gas had increased—he supposed because people got so accustomed to the glare of light that they wanted more gas to keep pace with it. Gas engineers were also beginning to show how gas could be used for other purposes than illumination. He expressed his approval of the improvements inaugurated that day, and spoke of the abilities of the Consulting and Resident Engineers, and of Mr. Bellamy, the Secretary of the Department—saying the latter had the true interests of the Corporation and the ratepayers at heart. Personally he (the Chairman) wished to see the price of gas reduced; and he thought some consideration should be next paid to the consumers. It was unfair to ask the users of gas to be taxed for the relief of the rates. The Gas Department had already handed over to the Corporation about £59,630; and in the last ten years, over £27,000. This he regarded as practically taxing the consumers of gas twice over. When responding to the toast of "The Engineers and Contractors," Mr. George Winstanley expressed his conviction that the extensions would result in a saving in the manufacture of gas in a short period, and that there would be better profits and greater illuminating power. He commented on the satisfactory way in which the contracts had been carried out, and thought that any advantage which might arise financially should rather be given to the consumers than distributed among the ratepayers. He advised, however, that care should be observed in maintaining the works in a state of efficiency. Mr. H. Bradford (Messrs. Chadwick and Co.) and Mr. T. E. Priestman (Messrs. R. & J. Dempster) also responded, and the proceedings terminated.

A PUBLIC LIGHTING DISPUTE AT SETTLE.

Litigation Threatened.

A little difficulty has arisen between the Settle Gas Company and the Parish Council regarding the terms on which the district shall be lighted during the coming winter. The Lighting Committee of the Council have met several times to discuss the subject; and their final proposals are embodied in the following suggested agreement, as to which, save perhaps in one particular, there seems nothing to which one can seriously take exception: "(1) That all burners and governors be supplied, fixed, repaired, and maintained by the Gas Company, as, and when required by, and to the satisfaction of the Lighting Authority, and at a fair and reasonable cost. (2) That not less than six meters be rented by such Lighting Authority, and attached to such lamps as shall be agreed upon. (3) That the price paid by the Lighting Authority be 4s. 2d. per 1000 cubic feet, subject to a discount of 2d. per 1000 cubic feet if payment be made at the next succeeding meeting of the Parish Council after the account is presented. (4) That the Gas Company repair and maintain all present and future service-pipes, from the mains to the top of each lamp; all such pipes to belong to, and remain the property of, the Company. (5) That all new service-pipes be supplied, laid, and connected by the Company, provided the distance does not exceed 30 feet; beyond that distance to be a matter of arrangement. (6) That the Lighting Authority have power to convert such of the street-lamps into incandescent lights as they think fit, such conversions to be done by the Gas Company at the expense of the Lighting Authority, and that the gas consumed by such lights be paid for by average meter indication; the location of such meters to be an arrangement between the Gas Company and the Lighting Authority." Now the only difference between this agreement and one entered into in 1896 is the addition of clause 6, and the insertion, in clause 1, of the words "and to the satisfaction of the Lighting Authority, and at a fair and reasonable cost." Lighting authorities, gas managers are well aware, are not always composed of "fair and reasonable" men; and this extension of the first clause certainly opens a passage for endless dispute. But to the last clause, there can be little objection. The Gas Company, however, say they will not agree to any addition or alteration of the 1896 agreement. The difficulty was discussed at a meeting of the Council on the 6th inst., when the Chairman, Mr. C. J. Lord, pointed out that they had the choice of three courses: (1) To agree to the Company's terms; (2) to light by oil; or (3) to demand a supply of gas under the Gas-Works Clauses Act, and test the case before two Justices. It was the recommendation of the Lighting Committee that the third course be taken. A long discussion followed. Mr. Harger, one of the Directors of the Company, thought there was nothing at all objectionable in the amended agreement; and he was of opinion that it could never have been fully discussed at a Board meeting, or he was sure the members would have agreed to it. Mr. Graham, another Director, also thought it reasonable enough. A proposition was made that Mr. Harger should again submit the agreement to his colleagues; but an amendment was carried (though several members did not vote) that the Council proceed under the Gas-Works Clauses Act and demand a supply of gas from the Company, and, failing their compliance, to institute a test case before the Magistrates. A further resolution requested the Company to supply gas to the public lamps from the following Saturday.

ELECTRIC LIGHTING NOTES.

The Wolverhampton Town Council decided on Monday last week to borrow £3200 to be spent immediately on electric plant. This is part of a scheme of extension which is estimated to cost £29,000.

The Newington Vestry last Wednesday adopted a recommendation of the Electric Lighting Committee, that application be made to the London County Council for a loan of £50,000 to enable the Vestry to carry out their electric lighting scheme.

A Local Government Board inquiry was held at Hanley last Wednesday relative to an application by the Corporation for power to borrow a further sum of £4000 for electric lighting purposes. Fresh loans for the undertaking have been raised by the Corporation in quick succession. The first (£21,000) was obtained in 1893; then in 1894, a further £1100 was required; in 1895, two sums of £5000 and £19,000; and in 1897, £14,880. There are 363 private consumers, and these are said to be increasing at a rapid rate.

Electric lighting matters at Leamington are just now attracting a good deal of attention. The Town Council have decided to apply to the Board of Trade for a Provisional Order to light the town with electricity; but meanwhile the Midland Electric Light Company, who already supply numerous private consumers in Leamington, and are in possession of the field, are laying down new mains. The British Electric Traction Company, and the Warwick and Leamington Tramways Company, are agitating at the same time for permission to substitute the overhead electric system for horse traction; but to the new method the local authorities are opposed.

A Local Government Board Inspector has been holding an inquiry at King's Lynn relative to an application by the Town Council for sanction to borrow £30,000 for purposes of electric lighting. Professor Henry Robinson explained at considerable length his plans for the installation; and gave it as his opinion that it would be a commercial success. The only opposition came from Mr. Alderman Pridgeon, who is a Director of the local Gas Company, though he explained that this was not the reason he opposed the scheme; his objection being solely on the ground of expense to the ratepayers, who, he said, were already heavily burdened owing to other necessary public works.

Last Wednesday, Mr. W. A. Ducatt held an inquiry at Brighton, on behalf of the Local Government Board, in regard to a proposal of the Town Council to borrow £56,300 for electric lighting purposes. The Town Clerk explained that the amount applied for practically included the probable expenditure for the present and next year. The debt of the Corporation on the electric lighting account was £206,076; and then there was a sum of £11,426 which had been sanctioned and not yet taken up. Mr. Arthur Wright, the Electrical Engineer, stated that about 450 new customers were expected during the next two years, and sufficient capital had been provided to supply their wants.

The extension of an estimate by "a few thousand pounds" is regarded with indifference by the Electric Lighting Committee of the Middlesbrough Corporation. They have selected a site for their electric lighting station, and have decided to instruct Mr. Hammond to proceed with the specifications for lighting the compulsory area. They reported to this effect at the meeting of the Council last Tuesday, upon which Mr. Burrows inquired if it was true that the estimate had been raised from £25,000 to £35,000. Alderman Jones replied that the estimate was entirely a tentative matter. They had not bound Mr. Hammond to any amount, although he had said that for a few more thousand pounds he could suggest a more efficient system. Mr. Burrows, still objecting to the previously stipulated amount of £25,000 being exceeded, moved that Mr. Hammond be instructed to have due regard to this sum in providing his scheme. But on being put to the vote, the motion was lost.

The "Hull News" has published an illustrated description of the new electric light station which has been completed for the Corporation within the past few weeks, and for which £40,000 was voted by the City Council, after more than one heated debate. Our contemporary predicts that the new installation will be working up to its full capacity before the end of the year; "an almost phenomenal increase in the number of customers having already to be recorded." In the engine-room, there are four steam dynamos representing a total of 760-horse power. The current is generated at from 2000 to 2500 volts, and is transmitted to two sub-stations, where it is transformed to 220 volts. In the boiler-room, there has been erected one water-tube boiler of 150-horse power, and two Lancashire boilers of 350-horse power each; while besides these there are a storage battery, and electric pumps. An additional nine miles of mains have been laid. Cables are also about to be put down in East Hull; and to meet the contemplated demand in this and other localities, new plant of 750-horse power is about to be ordered. With the latter extension, the city will possess electric mains in most of the leading thoroughfares.

At the meeting of the Bury St. Edmund's Town Council last Tuesday, confirmation was given to the unofficial announcement which was made about a fortnight since that the Local Government Board had refused to sanction the application of the Corporation for a loan for their electric light scheme in its present form, on account of the great opposition which the proposal has aroused in the town. The Board suggested, however, that the scheme might be modified, so as only to embrace the compulsory area described in the Provisional Order, and that lighting the streets should be for the time abandoned. The Board further intimated that, in connection with any modified proposal for private lighting only, a list of applicants for the light should be obtained and forwarded to the Board. Upon receipt of this report, the Electric Lighting Committee held a meeting; and the result of their deliberations was that they adhered to the opinion that their scheme for lighting the town was the best, inasmuch as the inclusion of the public lighting would ensure "an immediate income at a comparatively small outlay, and would also release the £2500 held by the Gas Company." Under the circumstances, however, they pointed out that there were two courses open: (1) To adopt a modified form of private lighting, which is estimated to cost £13,000 for the compulsory area, or £15,000 if certain other streets are included; or (2) to sell the Provisional Order to a company. The Committee felt strongly that it would be very undesirable to adopt the latter course. The Council endorsed this opinion; and the Committee were requested to submit a modified scheme in October.

Gas-Works Extensions at Widnes.—The Widnes Town Council have decided to apply to the Local Government Board for sanction to borrow £4200 for alterations and extensions of the gas-works.

New Joint-Stock Companies.—Kurtz, Limited, is the title of a Company which has been registered, with a capital of £100,000 in £1 shares, for the purpose of accepting an assignment by Hardman and Holden, Limited, of an agreement, dated Aug. 19 last, and made by Hardman and Holden, Limited, of the one part, with the representatives of Charles Kurtz and Sons, of Liverpool, tar distillers, of the other part, for the use, on terms, of the works in Liverpool of the last-mentioned firm; also for the fulfilment of certain specified contracts and obligations therein contained, to carry on the trade of tar distillers, to manufacture, carbonize, distil, or in other ways manipulate coke, coal, oxides, ammoniacal liquor, acids, or any other chemical substances, or any residual product or products obtainable therefrom, and for several other purposes. The Wellington (Somerset) Gas, Coke, and Light Company, Limited, has been registered with a capital of £14,000, in £10 shares; and the Innerleithen Gaslight Company, with a capital of £3333, in £3 shares.

Provincial Gas Companies.—The Rothwell Gas Company, who met on Monday last week, had an available balance of £1317 on the past half-year's working; and the maximum dividend was declared. The shareholders also sanctioned the issuing of 200 additional 7 per cent. £10 shares; the capital being required for a holder which Messrs. Clayton, Son, and Co., Limited, are erecting. The shareholders of the Lewes Gas Company have also held their half-yearly meeting. It was reported that on the revenue account there was a profit of £1520 for the half year; and this gave a disposable balance of £2441 on the net revenue account. After paying dividends of 5 and 3½ per cent. upon the two classes of capital, a balance of £1058 remained. The Directors also announced that they had purchased some property adjoining the Company's premises for £2850, in order to provide accommodation for their increasing business. The remarks of the Chairman (Mr. James Broad) showed that there had been an almost general increase in the consumption of gas. The report and recommendation as to dividend were adopted. The Directors were also authorized to borrow on mortgage £1200 for the general purposes of the Company; and the prudent management of the Directors and the Engineer (Mr. Levi Monk) was duly acknowledged. The Ackworth, Featherstone, and Sharlston Gas Company have, as the result of the past half-year's trading, £1584 available for distribution; and a dividend at the rate of 7 per cent. has been declared. The Directors have been empowered to issue to the shareholders a further £2000 in shares, for the purpose of paying off an overdraft on the bank and on capital account.

THE DRY WEATHER AND THE SUPPLY OF WATER.

There is little change to report in the position of the water supply question in the East-end of London; and a brief review of what has transpired during the week will suffice. The deputation to Sir Hugh Owen, the Secretary of the Local Government Board, towards the close of the previous week, on the subject of the supply to the schools in the district of the East London Company, resulted on Monday in arrangements being made by the Directors for a constant service to the schools between the hours of 9 a.m. and 5 p.m. The newly-formed body calling themselves the "East London Water Consumers' League," issued, in the early part of the week, a manifesto embodying their views on the situation. The document simply consists of a long string of virulent abuse, and not a single suggestion is offered towards a solution of the immediate problem. At their meeting on Thursday, the Directors of the Company decided to continue the present four hours' supply. It was reported that the amount of water pumped during the previous week averaged 33 million gallons a day, of which half a million came from the Kent Company. The remaining 32½ millions were made up as follows: 20¼ millions from the Thames and chalk wells; 6 millions from the Lea; and 6 millions from the reservoirs. The reserve stock remaining in the reservoirs was 170 million gallons. The work of connecting the Southwark and Vauxhall Company's mains with the East London system has proceeded more rapidly than was anticipated; and the actual junction was effected at six o'clock on Sunday morning. The proposal is to utilize the water thus obtained for a district near the Tower, which will be isolated from the rest. Its size will depend on the amount of water which it is found possible to get through the connecting-main. The effect of this arrangement will be to diminish the drain on the other resources to a corresponding extent; but it will not mean a resumption of the constant supply anywhere. The isolated area will be treated exactly like the rest as regards hours of supply; and at night, when the water is shut off, the Southwark contribution will be pumped into the East London general system, so that the reservoirs will get the benefit of it. The resumption of the constant service is quite impossible until the Lea is again in good flow, and the exhausted reservoirs are at least partly replenished. The extraordinary situation caused by the failure of the Lea this year does not seem to be realized yet by those who offer their criticisms and comments on the conduct of the East London Company. An "indignation" meeting of the ratepayers of Shoreditch, convened by the local Vestry, was held on Thursday, at which the Company, and all connected with the concern, were denounced in the most scathing terms. In one resolution the meeting protested against "the long series of water famines in recent years in the district . . . culminating in the dangerous and unprecedented limitation of water this year, due entirely to the Company endeavouring to supply a larger area than its available sources of supply warrant." A second resolution called upon "the Government to pass immediate legislation placing the London Water Supply under municipal control, with power to seek fresh sources of supply sufficient to meet this first necessity of the poor." Another resolution, which is remarkable for its want of courtesy, was passed during the week by the Poplar District Board of Works. It repudiated the allegation contained in the recent circular letter of the Local Government Board as to the wilful waste of water by consumers, and suggested that, when the President of the Board visited East London "to investigate the circumstances of the inconvenience the inhabitants sustain in consequence of an insufficient water supply, he should come as a disinterested inquirer, and not for the purpose of absolving the Water Company."

The Hackney Vestry on Wednesday appointed a Committee to prosecute an application to the Court of the Railway and Canal Commission, under the Metropolitan Water Act of 1897, for a declaration that the East London Company "have failed to use all reasonable and proper measures to perform their statutory duty in supplying a constant supply of pure and wholesome water to every part of their district, and for an order that the said Company do supply pure and wholesome water to every part of their district, and a constant supply of pure and wholesome water sufficient for the domestic purposes of the inhabitants constantly laid on at such pressure as to make such water reach a height of 40 feet above the level of the pavement adjoining, and nearest to the point at which such supply is required, and to give and continue to give such inhabitants a constant supply for domestic purposes in manner prescribed." The full text of the application is too long to reproduce; but it may be stated that the Vestry allege that the Company are in default: "(1) In having allowed their reservoirs to become practically empty before taking precautionary measures; (2) in not taking timely measures to prevent the exhaustion of their supplies of water, or in not taking timely measures to supplement the deficiency of their supplies from other sources; (3) by reason of their neglect to provide against the recurrence of a scarcity, the probability of which was manifested by the deficiency which occurred during the summer of 1895; (4) by reason of their neglect adequately to inspect and examine fittings, and to provide against waste and leakage; and (5) by reason of their neglect to supply a proper force of water to reach a height of 40 feet above the pavement in their district." A conference of members of Local Authorities was held at the Hackney Vestry Hall on the following day, at which a "demand" was made that the Government should introduce a Bill next session to amend the Acts of Parliament affecting the water supply of East London.

We take the following for what it is worth from the "Local Government Journal": "It is stated that, when the autumn Cabinet Councils are held, Mr. Chaplin will submit a proposal from the Local Government Board to deal with the London Water Question on the basis of purchasing the East London Company, and leaving the other Companies in possession of their rights. In the poverty-stricken district served by the East London Water Company there have been three severe famines in three years. It is thought that a forced purchase of the concern would serve as a warning to the other Metropolitan Water Companies, and would remove once and for all a danger that has become scandalous and intolerable. The difficult point to settle is the personality of the purchasing body. Mr. Chaplin favours a Special Board. The London County Council insists upon the recognition of its own interests in the matter."

At Birmingham and Leeds the consumers have been enjoined to exercise economy in the use of water; and from many other parts of the country news is daily being received of inconvenience and distress caused by the protracted drought. At Plymouth, it has been found necessary to curtail the supply. Some weeks ago the pressure was reduced, with the object of lessening the leakage; but as this did not altogether meet the necessities of the case, the supply has now been cut off between the hours of 8 p.m. and 6 a.m. The rainfall at the Head Weir, where the River Meavy is tapped for the supply of the town, was 22 inches to the end of August, or about 7 inches less than the normal rainfall for the first eight months of the year. In addition to this, Plymouth has since June been supplying East Stonehouse; and the consumption and waste in the district have been largely in excess of the estimate. The reservoirs connected with the Plymouth Water-Works contain only about three days' supply; so that the town is practically dependent upon the daily flow from the river. This week, however, there is promise of local rejoicings over the completion of a storage reservoir at Burrator, which will hold 650 million gallons, and put an end to all fear of a water famine in the borough.

THE WATER SUPPLY OF LARGE ENGLISH TOWNS.

A correspondent of "The Times" has obtained the daily amount of water per head supplied at the end of August in twenty-five large towns in England and Wales. The figures have been furnished by the Engineers of the various water authorities, and they represent the amount supplied for all purposes in each case. The towns are stated in their order of precedence according to the quantity of water supplied; and for purposes of comparison, the average London supply and that given by each separate Company is inserted in its proper place:—

	Gallons per Head.		Gallons per Head.
Grand Junction*	55½	Croydon	31
Chelsea*	47	Manchester (average 27)	30
Southwark and Vauxhall*	45	Halifax	29
Brighton	43	Swansea	28
Plymouth	43	Blackburn	25
Hull	43	Bristol	23½
London (average)	41	Bolton	23¼
Lambeth*	40	Birmingham (average)	23
West Middlesex*	39	Huddersfield	23
New River*	35½	Burnley	23
Bradford	35	Oldham	22
Leeds	35	Cardiff	22
East London*	34½	Sheffield	21¾
Preston	34	Nottingham (average 17½)	19
Kent*	33½	Birkenhead	18
Liverpool	31½	Leicester	18

* London Companies.

It will be seen that three of the London Companies head the list; not a single provincial town in England and Wales gives so large a supply. Only three towns give more than the average for all London; and only seven give more than the least generous of the London Companies. The remaining eighteen, including all the largest—Liverpool, Manchester, Birmingham, and Sheffield—give less, and some very much less. No fewer than thirteen towns are at present putting up with less water than the East London restricted supply. Moreover, it is to be observed that in the manufacturing towns the amount required for trade purposes is much larger than in London. For instance, in East London the domestic supply is at present about 18 gallons per head; in Sheffield it is 12·75 gallons; and in Birmingham it is 13·95 gallons for "domestic, fire, and waste."

The Period for the Repayment of Loans.—At a meeting of the Water and Sewers Committee of the Swansea Corporation last Tuesday, the Town Clerk (Mr. John Thomas) reported the sanction of a loan by the Local Government Board of £413 for the purposes of water-main extensions, the money to be repayable in thirty years. He pointed out that while the term allowed by Parliament for the repayment of a quarter of a million of money in respect of the Cray water-works scheme was sixty years, the Local Government Board for a loan of £100,000 in respect of water purposes only granted thirty years. He thought the position a monstrous one that would sooner or later have to come before Parliament. Mr. R. Martin considered it would strengthen their position by that time if they protested against it now. The Town Clerk agreed.

A Fatality at the Grantham Gas-Works was the subject of an inquest at the Grantham Borough Hospital yesterday week. It appeared from the evidence given by Mr. Robert G. Shadbolt, the Manager of the works, and other witnesses, that the deceased, a man named Kirk, aged 23, was a stoker. Coal for the works is shunted into the yard, and taken on to a set of rails immediately outside the retort-house. These rails are constructed on a decline of one in 78; so that waggons can be run down to any place where they are required. When a waggon stands at one of the doors of the retort-house, the break should be applied, and the outside wheels scotched. On the previous Wednesday night, deceased was found pinned between a waggon and the wall of the retort-house near a door. Mr. Shadbolt and a man named Parker punched the waggon back about three yards and liberated deceased. It seems that Kirk was standing on the left buffer of a waggon of coals which he was going to take to one of the doorways in the retort-house. He could not move the waggon himself; so he took off the break, and Parker went and eased the wheel with a lever and pushed with his shoulder. The waggon went slowly along for eight or ten yards, and then stopped. Parker called out to the deceased asking him if it was far enough, heard him groan, and then found him pinned between the waggon and the wall. Mr. Shadbolt said he had cautioned the men generally, and given individual instructions against riding on trucks. Circumstances pointed to the opinion that deceased had taken the break (which was on the side nearest the wall) right off, instead of allowing it to hang and punching the waggon down. Deceased had no occasion to get on the waggon; and before he died he told the doctor at the hospital that he was riding on the truck, and was trying to put on the break with his foot. He failed to do so, however, and stooped to do it with his hand, when he was crushed. Deceased said it was his own fault. The Jury returned a verdict of "Accidental death," but expressed the opinion that the waggons should all be turned one way, so that the break would be at the rear of each waggon, and thus away from the wall of the retort-house.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

I have been favoured with a copy of a circular which has been issued by the Welsbach Incandescent Gas-Light Company, Limited, in which is given a comparison of the cost of lighting by the Welsbach new burner and by electricity. The comparison is made with Edinburgh gas, which has been selected, I suppose, because the price—3s. per 1000 cubic feet—admits of easy calculation. The result is more striking than would appear to most people before the figures are presented to them. Gas giving a light of from 25 to 30 candles per cubic foot, if burned for 1000 hours, would cost 3s., which is equal to an average cost of 1d. per candle per 1000 hours. With electricity, a 16-candle lamp in 1000 hours would consume 60 units, which, at 4d. per unit, would amount to 20s., or 15d. per candle per 1000 hours. Ten lights would cost in a year: With gas, £1 10s.; with electricity, £15 12s. 6d. There would thus be a saving with gas of £14 2s. 6d. It will be observed, too, that a third more light would be obtained from the gas than from electricity. This comparison places the relative value of the two lights in so concrete a form that it must arrest attention. It effectually disposes of the claim, which is beginning to be made, that electricity is probably the cheaper of the two lights. Of course, the advantage with gas would be larger were the comparison made with places where the price is less than in Edinburgh.

During the past financial year, the Kilmarnock Corporation Gas Works had a revenue of £14,968, of which £12,752 was received for gas, £1658 for tar, £51 for old lime, and £467 for coke. The expenditure amounted to £14,155, of which £6458 was paid for coal, £383 for lime, and £3438 for wages. The profit on the year's working was £813. To the latter sum there fell to be added a balance brought forward of £12,616, making £13,429. This sum had been largely drawn upon in the course of the year. There had been expended £843 on new sulphate plant, and £6706 on a new gasholder and manager's house; and £700 had been paid into the sinking fund. This is the first payment to the fund; and now the Auditor has taken exception to the action of the Corporation, holding that a payment should have been made last year. The quantity of gas manufactured was 113,191,600 cubic feet—an increase of over 10 million cubic feet, or nearly 10 per cent. There were 11,790 tons of coal carbonized—an increase of 240 tons. The yield of gas per ton was 9600 cubic feet—an increase of 600 cubic feet per ton. Unaccounted-for gas amounted to 10 per cent., as compared with 12¾ per cent. The debt upon the undertaking is £21,685; and the profit of £813 is thus equal to 3¾ per cent. A carefully prepared appendix is given, along with the accounts, which contains details of the income and expenditure both per ton of coal carbonized and per 1000 cubic feet of gas made. Indeed, the whole accounts are presented, as in former years, with a clearness, precision, and fulness which makes everything perfectly plain.

I have not had long to wait for the fulfilment of my expectation that someone might be found who would object to the Edinburgh and Leith Gas Commissioners sending deputations to England and the Continent. I had Mr. Waterston in my eye when I wrote the remark; and I perceive that at a meeting last night he is reported to have criticized the spending by the Commission of £878 in deputations. Having put his hand to this plough, Mr. Waterston is not likely to turn back until he has expended some vigorous work upon what, to him, is a rich field; but, so far as the welfare of the Gas Commission is concerned, his labour will be but a veritable ploughing of the sands.

The proposed transfer of the undertaking of the Cupar Gas Company to the Corporation has been abandoned. Last night the Town Council received a report from the Committee which they appointed in June to consider the proposal. The Committee communicated with the Company, but could not get the officials to mention a sum at which they would be prepared to sell. They had ascertained that the capital of the Company is £8900, and that the average profit during the past seven years had been £744. An offer, on very favourable terms, to light up the town by means of electricity had been received from a London company. The Committee had therefore come to the conclusion that it would not be in the interest of the ratepayers that they should acquire the gas undertaking. After some criticism, the Council, by a majority, adopted the report of the Committee.

The Corporation of Falkirk have had the unpleasant experience of differing with the Assessor over the valuation put by that somewhat autocratic functionary upon the gas-works. Formerly, the valuation was £5440; but diminished profits led to a very large reduction. Now the Assessor has raised the valuation to £4800. Against this the Corporation, as Gas Commissioners, appealed to themselves as the Town Council. The hearing came on on Tuesday last. The Assessor defended his valuation on the ground that it was made on the principle upon which all gas-works are valued. No doubt he had made a correct valuation; but the Town Council were unable to regard the matter in the proper light. They looked to Stirling, and found the gas-works there, belonging to a Company, assessed at about one-half the sum at which the Falkirk works are valued. It mattered not to them whether a reason for this state of matters existed or not; they simply wished that their works should not be rated higher than others. The Assessor was obdurate; and it seemed to me that the only false move he made in all the proceedings was in the remark that the Stirling Gas-Works had never been properly assessed, and that the ratepayers there were being robbed of £800. This was a gratuitous sneer, and was altogether out of place. But the Assessor was not all-powerful. He was asked if the calling of the Corporation there was a farce, and whether they had not the power to decide. They had the power; and they reduced the valuation to £4500. It is open to the Assessor to appeal to the Supreme Court; and if he does so it is almost a certainty that he will get his valuation restored. But the probability is that he will not consider it worth his while to appeal. It is appropriate, in connection with these proceedings, to remember that it was an appeal case from Falkirk, in the Supreme Court in 1883, which led to the laying down of the principle that gas-works should be valued upon the rent which a hypothetical tenant would pay for them. Falkirk was instrumental in having the new method of valuation fixed; and now the Corporation of Falkirk reject the method.

Curiously enough, the question of the valuation of the Stirling Gas

GAS AND WATER COMPANIES STOCK AND SHARE LIST.

Referred to on p. 632.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	Apl. 15	10½	Alliance & Dublin 10 p. c.	22½—23½	..	4 9 4
100,000	10	,,	7½	Do. 7 p. c.	16½—17½	..	4 5 9
300,000	100	July 1	5	Australian 5 p. c. Db.	105—107	..	4 13 6
200,000	5	May 26	6	Bombay, Ltd.	6½—7	..	4 5 9
40,000	5	,,	6	Do. New, £4 paid	4½—5	..	4 16 0
280,000	Stk.	Aug. 12	12	Brentford Consolidated	275—280	..	4 5 9
240,000	,,	,,	9	Do. New	210—215	..	4 3 9
50,000	,,	,,	5	Do. 5 p. c. Prf.	140—145	..	3 9 0
159,375	,,	June 10	4	Do. 4 p. c. Db. Stk.	130—135	..	2 19 3
220,000	Stk.	Sept. 15	11½	Brighton & Hove Orig.	262—267*	−½	4 6 2
226,320	,,	,,	8½	Do. A. Ord. Stk.	190—195*	−2¾	4 7 2
933,500	Stk.	Aug. 31	5	Bristol, 5 p. c. max.	125—130	..	3 16 11
420,000	20	Mar. 30	10†	British	51—53	..	3 15 6
50,000	10	Aug. 12	11½	Bromley, Ord. 10 p. c.	25—27	..	4 5 2
75,000	10	,,	8½	Do. 7 p. c.	20—22	..	3 17 3
500,000	10	Apl. 29	6	Buenos Ayres (New) Ltd	9—9½	..	6 6 4
98,122	Stk.	June 29	4	Do. 4 p. c. Db. Stk.	98—100	..	4 0 0
150,000	20	July 14	8½	Cagliari, Ltd.	29—30	..	5 10 0
100,000	10	June 10	7	Cape Town & Dis., Ltd.	15—16	..	4 7 6
50,000	50	May 3	6	Do. 6 p. c. 1st Mort.	58—60	..	5 0 0
550,000	Stk.	Apl 15	13½	Commercial Old Stock	315—325	..	4 3 1
200,750	,,	,,	10½	Do. New do.	252—257	..	4 1 8
200,750	,,	June 10	4½	Do. 4½ p. c. Lb. dc.	148—153	..	2 18 10
800,000	Stk.	June 10	12	Continental Union, Ltd.	207—212	..	5 13 2
200,000	,,	,,	9	Do. 7 p. c. Prf.	197—202	..	4 9 1
51,600	Stk	Aug. 31	14	Croydon A 10 p. c.	305—310	..	4 10 4
168,400	,,	,,	11	Do. B 7 p. c.	255—265	..	4 3 0
555,000	Stk.	Aug. 12	5½	Crystal Palace Ord. 5 p. c.	125—130	..	4 0 9
60,000	,,	,,	5	Do. 5 p. c. Prf.	140—145	..	3 9 0
486,090	10	July 28	11	European, Ltd.	23—24	..	4 11 8
354,060	10	,,	11	Do. £7 10s. paid	17—18	+½	4 11 9
5,922,230	Stk.	Aug. 12	12½	Gaslight & Coke, A, Ord	291—296	+3	4 2 9
100,000	,,	,,	4	Do. B, 4 p. c. max.	120—125	..	3 4 0
665,000	,,	,,	10	Do. C, D, E, 10 p. c. Prf.	305—310	..	3 4 6
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	152—157	..	3 3 8
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	230—240	..	3 2 6
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	195—200	..	3 10 0
468,000	,,	,,	10	Do. J, 10 p. c. Prf.	305—310	..	3 4 6
476,000	,,	,,	6	Do. K, 6 p. c. Prf.	182—187	..	3 4 2
1,061,150	,,	June 10	4	Do. 4 p. c. Db. Stk.	131—133	..	3 0 2
294,850	,,	,,	4½	Do. 4½ p. c. do.	148—153	..	2 18 10
958,000	,,	,,	6	Do. 6 p. c. do.	199—203	..	2 19 1
70,000	10	May 12	8	Hongkong & China, Ltd.	14—15	..	5 6 8
3,800,000	Stk.	,,	10	Imperial Continental	218—223	+3	4 9 8
876,400	100	Aug. 2	4	Do. 4 p. c. Dbs. Red.	98—101	..	3 19 3
473,600	Stk.	Aug. 12	3½	Do. 3½ p. c. Db. Stk.	101—104	..	3 7 4
560,000	100	Apl. 1	5	Met. of Melbourne 5 p. c. Db.	111—113	..	4 8 10
250,000	100	,,	4½	Do. 4½ p. c. Db.	107—109	..	4 2 7
					* Ex div.		

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
75,000	5	June 29	6	Malta & Medn., Ltd.	4½—5½	..	5 14 3
541,920	20	June 10	5	Monte Video, Ltd.	13½—14½	..	6 18 0
617,946	Stk.	Aug. 31	9¾	Newc'tle & Gatesh'd Con.	230—240	..	4 1 3
252,355	Stk.	Jan. 3	8½	Do. 8½ p. c. Db. Stk.	113—117	..	2 19 10
150,000	5	May 26	8	Oriental, Ltd.	7½—8	..	5 0 0
135,000	5	,,	8	Do. New, £4 10s. pd.	6½—7	..	5 2 11
15,000	5	,,	8	Do. do. 1879, £1 pd.	1½—1¾	..	4 11 5
60,000	5	Mar. 11	7	Ottoman, Ltd.	5—5½	..	6 6 2
500,000	100	June 1	6	People's Gas of Chicago 2nd M. Bd.	103—108	..	5 11 1
848,070	10	May 26	6	River Plate Ord.	9½—9¾	..	6 3 1
250,000	Stk.	June 29	4	Do. 4 p. c. Db. Stk.	99—101	..	3 19 3
250,000	10	Apl. 29	10	San Paulo, Ltd.	15—16	..	6 5 0
135,000	Stk.	Sept. 15	10	Sheffield A.	242—245*	..	4 1 8
209,053	,,	,,	10	Do. B.	242—245*	..	4 1 8
447,427	,,	,,	10	Do. C.	242—245*	..	4 1 8
5,600,000	Stk.	Aug. 12	5½	South Metrop., 4 p. c. Ord.	140—143	..	3 14 7
1,460,000	,,	July 14	3	Do. 3 p. c. Db. Stk.	101—104	..	2 17 8
60,000	Stk.	Aug. 31	12	Tottenham and A.	280—290	..	4 2 9
60,000	,,	,,	9	Edmonton B.	200—210	..	4 5 9
182,380	10	June 10	7	Tuscan, Ltd.	10½—11½	..	6 1 9
149,900	10	July 1	5	Do. 5 p. c. Dbs. Red.	100—103	..	4 17 1
				WATER COMPANIES.			
746,164	Stk.	June 29	10½	Chelsea, Ord.	313—318	..	3 6 0
150,000	,,	,,	5	Do. 5 p. c. Prf.	170—175	..	2 17 2
160,000	,,	,,	4½	Do. 4½ p. c. Pf. Stk., 1875	148—152	..	2 19 3
175,785	,,	Mar. 30	4½	Do. 4½ p. c. Lb. Stk.	157—162	..	2 15 7
1,720,560	Stk.	Apl. 15	8	East London, Ord.	213—218	−4	3 13 5
654,740	,,	June 29	4½	Do. 4½ p. c. Db. Stk.	157—160	..	2 16 3
390,000	,,	,,	3	Do. 3 p. c. Db. Stk.	103—105	..	2 17 2
700,000	£0	June 29	7½	G'd Junct'n, 10 p. c. max.	115—118	..	3 3 7
310,000	Stk.	Mar. 30	4	Do. 4 p. c. Db. Stk.	142—147	..	2 14 5
708,000	Stk.	Aug. 12	14	Kent	364—369	..	3 15 11
160,000	,,	,,	7	Do. New, 7 p. c. max.	212—217	..	3 4 6
1,043,800	100	June 29	10	Lambeth, 10 p. c. max.	298—303	..	3 6 0
406,200	100	,,	7½	Do. 7½ p. c. max.	227—232	..	3 4 8
850,000	Stk.	Mar. 30	4	Do. 4 p. c. Db. Stk.	140—145	..	2 15 2
500,000	100	Aug. 12	12½	New River, New Shares	432—437	+2	3 0 7
1,000,000	Stk.	July 28	4	Do. 4 p. c. Db. Stk.	140—145	..	2 15 2
902,300	Stk.	June 29	6	Southw'k & V'xhall, Ord.	166—171	..	3 10 2
126,500	100	,,	6	Do. do. 7½ p. c. max.	157—162	..	3 14 1
489,200	Stk.	,,	5	Do. do. 5 p. c. Prf.	168—172	..	2 18 2
1,019,585	,,	Apl. 15	4	Do. 4 p. c. A Db. Stk.	141—144	..	2 15 7
1,155,066	Stk.	June 10	10	West Middlesex	300—305	..	3 5 7
200,000	,,	,,	4½	Do. 4½ p. c. Db. Stk.	162—165	..	2 14 7
200,000	,,	Sept. 15	8	Do. 8 p. c. Db. Stk.	102—105*	..	2 17 2
					* Ex div.		

† Next dividend will be at this rate.

Company's works had been raised the day before the above proceedings took place. There the Assessor had raised the valuation of the works from £1700 to £2685; and the Company appealed and asked that it should be fixed at £1880. The Town Council heard the appeal. The Assessor complained that he had not been furnished with the necessary details as to the Company's income and expenditure. All he had been given, prior to the Saturday before, was a statement of the income and expenditure; and, having nothing else, he had fixed the valuation at the difference between these two sums. The explanation was that the particulars had not been given because the Treasurer was from home. It was maintained for the Company that they were entitled to certain deductions. An adjournment was granted in order that the Assessor might be furnished with the details he wished; and last night the Town Council adopted the Assessor's valuation, and dismissed the appeal. The question of the allowance or disallowance of these deductions is involved in the case; and the representative of the Company gave notice of an appeal against the decision to the Supreme Court.

The Stirling Police Commission had also before them on Monday the thorny subject of the costs incurred in their fruitless opposition to the Bill of the Gas Company, which they have not yet been able to dispose of. The immediate question under consideration was whether they should print the correspondence which passed between the parties. This correspondence would, of course, reveal the policy of the Corporation Committee and would particularly disclose who it was who first offered a compromise. Possibly the Gas Committee do not wish this made known. At any rate, they proposed to print the minutes of their meetings only, and not the letters. It was contended for the Committee that to expend £15 or £20 upon printing the letters would be a throwing away of public money. On the other hand, it was maintained by some that they could not dispose of the subject of expenses without seeing the correspondence. Provost Forrest ruled that the correspondence must be produced, with the exception of one or two letters which are marked "Private and Confidential." The subject was therefore continued till the prints be received. Perhaps the exception of the private and confidential letters may be sufficient for the purposes of the Committee.

The Dunfermline Gas Commissioners have effected an insurance of their workpeople against liability for accident, at common law, under the Employers' Liability Act, and under the Workmen's Compensation Act. The rate is 9s. per £100 of wages paid.

The Arbroath Gas Corporation have this week resolved to promote a Bill in Parliament for the purpose of conferring upon them additional borrowing powers, and also amending their present statutory powers in several particulars.

On Wednesday, Mr. W. Foulis, of Glasgow, had a meeting with the Perth Gas Commission relative to the plans for the new gas-works which are to be erected for Perth. The Commissioners are anxious that the total cost of the works should not exceed the estimates; and Mr. Foulis was able to point out how the plans which have been prepared by Mr. A. Wilson could be worked out so as to avoid going beyond the estimates. A newspaper report regarding the latest of the so-called irregularities in connection with the gas undertaking states that "at a meeting of the Gas-Works Committee accounts were submitted from the North British Railway Company and Mr. Hewat, restaurateur, in connection with the annual trip of the employees at the gas-works. It was resolved to refuse to recognize any liability for the expenses of the trip beyond the allowance to each employee sanctioned by the Committee. Councillor Stewart (on Monday) moved the adoption of the minute. He said that a gratuity of 3s. 6d. per man in addition to wages had been an allowance for five years; and that amounted to £11 or £12 in all. An account was presented to the Committee in charge of the last annual excursion, amounting to £35, which the Convener very properly declined to initial on account of the fact that it exceeded the sum voted by 300 per cent. Evidently the account had been passed for the last two years; and the accounts during these years also exceeded the amount voted. This was no justification for the account being passed this year—rather a reason why it should not. It seemed to him an extraordinary thing that those in charge of the excursion should expend more than the sum voted. He did not think it would be legal for them to pay the extra £24. Ex-Bailie Gow seconded. Councillor M'Vicar said his position was one of sympathy with the men. He moved that, in addition to the sum of 3s. 6d., the Commission make a grant. The Lord Provost said the motion was incompetent. If the workmen made a representation, it would be considered; but it was incompetent meantime. The matter at this point dropped: the Committee's minute being agreed to."

The Buckie Police Commissioners on Monday last week had a discussion as to the introduction of acetylene gas for lighting Buckpool. The Bon Accord Acetylene Gas Company, of Aberdeen, offered to supply acetylene gas plant free of expense in the first instance. The Company proposed to work it until May 1, 1899, and to supply the gas at 5s. per 1000 cubic feet, provided that, at the end of the period named, the Commissioners would take over the scheme for £564 (including 3 miles of piping, and 60 lamps), and provided also that the scheme was successful. After a good deal of discussion, it was agreed to make full inquiry with a view to adopting the light.

The Police Commissioners of the Burgh of Bathgate, West Lothian, have resolved to take over the works of the Bathgate Gas Company. The Company have been earning a handsome dividend; and the price charged for gas, 4s. 2d. per 1000 cubic feet, is held to be too high.

The recommendation of the Glasgow Corporation Water Committee regarding the pipe contract was before the Town Council on Thursday. Mr. Osborne, in moving that the tender of Messrs. Maclaren and Co., of Glasgow, be accepted, as recommended, stated that while the tender by the Philadelphia firm was the lowest, there fell to be added to the price quoted 3s. per ton—or £150 in all—for testing the pipes; and that when this was taken into account, Messrs. Maclaren and Co.'s offer was £82 less than that of the American firm. It was moved on the other side that the contract should be divided—the American firm to supply the pipes of from 7 to 12 inches in diameter, and the Glasgow firm those of 6 inches diameter and less. A somewhat acrimonious discussion ensued, from which it was apparent that many members of the Corporation have been alarmed by rumours of the formation of a ring of pipe-makers in Glasgow; and they evidently desired, by giving the contract to

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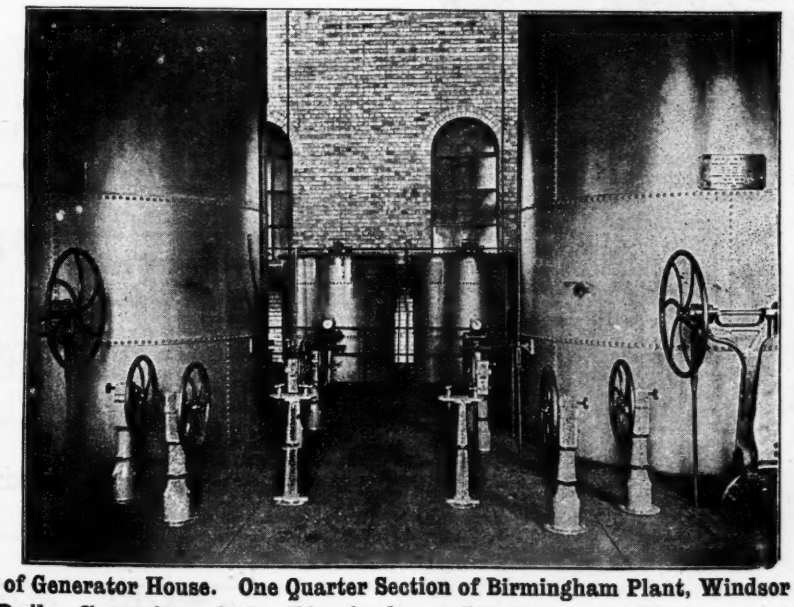

RESULTS PROVE EFFICIENCY.

Working Floor of Generator House. One Quarter Section of Birmingham Plant, Windsor Street Station.
The Maximum Daily Capacity of the Birmingham Corporation's Plant, which was erected by this Company, is 10 MILLION CUBIC FEET.

the American firm, to break down the ring. The feeling seemed strong, for the proposal to divide the contract was carried by 39 to 21 votes.

The Edinburgh and District Water Trust on Thursday fixed their assessments for the current year. The estimates of the Treasurer (Mr. W. Anderson) were that for supplies by meter and special supplies, a revenue of £51,993 would be derived. The estimated expenditure was £105,419, of which £27,191 was for interest, £24,012 upon annuities, and £13,308 contribution to sinking fund. There was a sum of £53,425 left to be provided out of rates. In moving the adoption of the Finance Committee's report, ex-Provost Wood, of Portobello, said that they had met to fix the amount of the rates for the year. A statement had been prepared by the Treasurer, which went into all the details of the probable income and expenditure; and it would not be necessary for him to go into the details, as they were not called upon to reduce the estimated expenditure in order to save a rise in the water-rates for this year. An important outcome of the statement was that the Finance Committee were able to recommend the adoption of the low rates which had prevailed for the last two years. This was very gratifying; and it was indicative of the prosperity of the Trust, which meant of the city and district. But notwithstanding there was an estimated expenditure upon the new works, amounting to £470,000, and the consequent increase of interest and exceptional expenditure for the year, no addition to the rates was found necessary. The estimated expenditure for the year was £105,419, and the estimated receipts £103,864—an excess of expenditure over income of £1555. But as there was an accumulated surplus in favour of revenue of £26,890, there was an ample margin to meet this excess of expenditure. He moved that the report of the Committee be adopted, and that the rates be fixed upon dwelling-houses, not exceeding £9 rent, at 4s. per annum; that the domestic rate upon houses above £9, be 5d. per pound; the rate upon shops, 2d. per pound; and the public rate, 1d. per pound. The Chairman (Bailie Sloan, of Edinburgh) seconded the motion, which was adopted.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Sept.* 17.

Sulphate of Ammonia.—In the early part of the week, the market was quiet; and sales of second-hand parcels are reported to have been made at under £10 per ton. Within the past few days, however, there has been more inquiry, resulting in an improved tone; and the closing quotations are £10 to £10 2s. 6d. per ton, delivered f.o.b. at the ports. The entire available supply has not been large; and there has been no urgency on the part of makers to sell. But consumers have been encouraged to leave prompt stuff alone by lower quotations for October delivery, while speculators have been quietly availing themselves of the weak market, in order to cover their September requirements. In the forward position, speculative offering has been freer. But buyers are shy even at a substantial discount on spot prices; and business actually done has been comparatively small. Makers remain firm at last week's quotations.

Nitrate of Soda.—There has been no change in this commodity; the spot quotation for fine quality being 7s. 7½d. per cwt.

LONDON, *Sept.* 17.

Tar Products.—The demand for creosote and other tar oils continues good; though there is no important improvement in their prices. Naphthalene is again more inquired after in all its states. It is rumoured that a new outlet for this salt has been found. The low price of anthracene so far has not tempted buyers; and no business, excepting a little of a speculative character, has been done for some time. This is remarkable, as the alizarine trade is reported to be busier, with a satisfactory outlook for the autumn and spring. Pitch maintains its improved value, and, with the settlement of the Welsh strike, should strengthen. Low prices are being taken for benzols; and a large line of crude Scotch naphtha has changed hands at a price which would only net the seller 3d. a gallon.

Average values may be taken as: Tar, 13s. 6d. to 17s. 6d. Pitch, east coast, 24s. 9d.; west coast, 22s. 6d. Benzols, 90's and 50's, 9d. Toluol, 1s. 2d. Solvent naphtha, 1s. 2d. Heavy naphtha, 1s. 1½d. Crude, 30 per cent., naphtha, 4d. Creosote, 2½d. Heavy oils, 45s. Carbolic acid, 60's, 2s. Naphthalene, 57s. 6d.; salts, 32s. 6d. Anthracene, nominal, "A," 4d.; "B," 3d.

Sulphate of Ammonia.—Very little business is being done; and this is not remarkable, seeing that the make is just now at its minimum, and producers have no stocks. Indeed, in two notable instances, makers are oversold; and the end of the month may see a squeeze for deliveries. A few parcels have changed hands at prices, according to position, from £9 17s. 6d. to £10 per ton, less 3½ per cent.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—A good deal of apprehension has prevailed throughout the coal trade of this district during the past week, with regard to the possibility of another dispute between the coalowners and the Miners' Federation on the wages question; but there is very little probability of any serious trouble occurring, as the conference held on Friday in London between the representatives of both sides has practically resulted in again referring the question for further consideration. There is little doubt that an amicable settlement will be arrived at. Neither side desires a conflict; and though apparently differences may exist respecting the advance in wages to be immediately granted, mutual concessions will probably bring about an understanding. With regard to the general position of trade, now that collieries have got through the arrear of orders which accumulated at the close of last month, owing to the extra buying in anticipation of the advance in prices, there is somewhat of a lull; and though pits are generally on full time, the output is not in all cases moving away. The market has also been somewhat unsettled owing to the advance in prices having been followed in other districts; but as a rule at the Lancashire collieries the advanced rates are being well maintained. The falling off in the demand has been chiefly in the better qualities suitable for house-fire purposes. Steam and forge coals are in fairly active request; and prices are readily maintained at 7s. 6d. to 8s. per ton at the pit. For engine classes of fuel there is a

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steady inquiry, which is generally taking away the present output, though the position varies at different collieries. Generally throughout Lancashire, slight advances on August rates are being secured. Common slack averages 3s. 6d. to 3s. 9d. per ton at the pit; medium, 4s. 3d. to 4s. 6d.; and best sorts, 4s. 9d. to 5s. 3d. There is still a fairly active shipping demand; but the pressure is not so great as recently, and prices have eased down somewhat. Ordinary steam coal now averages about 9s. 6d. per ton, though 10s. is still being obtained in special cases.

Northern Coal Trade.—There has been further weakness in the coal trade of this district in the last few days, more especially in steam coal and household fuel. The resumption of supplies from South Wales is affecting the demand here; and though the collieries are working fully, orders ahead are not so numerous as they were. Best Northumbrian steam coals are now down to 11s. per ton f.o.b.; and steam smalls to about 5s. 6d. Manufacturing coals are steady. In gas coals, the demand increases, as there is a considerable quantity yet to be delivered on old contracts; and the supplies on the newer deliveries at better prices are becoming heavier. About 10s. 6d. per ton f.o.b. is the current quotation for best gas coal, when not under contract; but only occasional cargoes seem to be sold at such prices. Prices of gas coke are firm, but are not locally altered this week.

Scotch Coal Trade.—Trade is good, and is likely to be so for some time. The Fifeshire miners have, by ballot, resolved to accept the masters' offer of an advance of 5 per cent. in wages; and there is thus a prospect of peaceable working. Stocks are greatly depleted by the demand for coal to take the place of that which should have been sent out from Wales. This makes it probable that work will be plentiful, and that, with the good demand, prices are likely to keep up better than might have been expected. This view explains the willingness of coal-owners to give the advances they have agreed to recently. Prices have receded a little, and may go down further. The quotations are: Main, 9s. 6d. per ton f.o.b. Glasgow; ell, 10s. 3d. to 10s. 6d.; and splint, 10s. 3d. The shipments for the week amounted to 235,365 tons—a decrease of 9267 tons upon the previous week (nearly all of which was due to the smaller shipments from Fife ports), but an increase of 49,100 tons on the corresponding week of last year. For the year to date, the total shipments have been 6,812,500 tons—an increase upon the same period of last year of 1,272,198 tons.

Horsforth Water Supply.—At a meeting of the Horsforth District Council yesterday week, the Water Committee reported on their further negotiations with regard to the proposed purchase of the water-works. It was decided to inform the Solicitors to the Company that the Council cannot bring the matter before the ratepayers until the consent of the shareholders to sell the undertaking has been obtained. It was proposed that the Council should request the Water Committee to lay before them, in full and definite form, a statement of what has been done, and how the negotiations stand. But thereupon an amendment that the Committee do not report to the Council until they have something definite to bring forward, was carried.

Wages and Hours of Labour at the Leeds Gas-Works.—The men employed at the Leeds Corporation Gas-Works have recently been holding meetings to consider the conditions under which they work, the hours of labour, and the wages paid. It is understood that, as the result, it is proposed to make an application to the Gas Committee for an advance of wages on behalf of the stokers, firemen, yardmen, purifying hands, and cinder throwers, and for an eight-hour day on behalf of the meter-fixers, meter-makers, and pipe-layers, who now work 52 hours per week.

Skipton Gas-Works Purchase Question.—At the meeting of the Skipton District Council last Thursday, the principal business was the proposed purchase of the gas-works. At the previous ordinary meeting, it was stated that the Council's offer of £30,000 for the works had been refused by the Company; and it was decided to have a special meeting of the Council to go into the whole matter. This had been done, with the result that a resolution was passed that the necessary steps be taken with a view to promoting an application in the next session of Parliament for an Act giving to the Council compulsory power to purchase the works. The Council now ratified this resolution; and it was decided to call a ratepayers' meeting to discuss the matter. So far as the Gas Company are concerned, they have nothing to say at present, except that they are unwilling sellers.

Stoking and Conveying Machinery for the Warrington Gas-Works.—It was announced by Mr. Heaton, at the last monthly meeting of the Warrington Town Council, that the Gas Committee had decided to adopt a tender of West's Gas Improvement Company for the supply of stoking machinery. He added that the agreement with the Company also provided for the supply of coal storage hoppers, and the laying out of the works so that the Committee could change to power-stoking machinery at a later date if the increased production of gas justified the outlay. The cost of hand stoking as at present carried on at the Longford works, is above 2s. per ton of coal carbonized; while the cost of working the manual-stoking machines would be about 1s. 6d. per ton. The interest, sinking fund, and repairs did not exceed 2d. per ton in any of the towns from which the Committee had obtained information. The proceedings of the Committee were confirmed.

Halesowen in Darkness.—The inhabitants of Halesowen and district have recently been experiencing great annoyance each night owing to the streets and main roads being in darkness, the lighting of the gas-lamps having been abandoned. This has naturally caused great indignation in many quarters of the town, especially among the tradesmen. It seems that about six weeks ago a deputation from the Halesowen District Council waited upon the Directors of the Gas Company, and urged a reduction in the charges for public lighting. Subsequently the Directors conceded a substantial reduction, and also made arrangements for the large lamps to be supplied with incandescent lights. All the conditions, including the price, were accepted by the District Council, except the term of lighting; and the only matter remaining in dispute is the length of the agreement. The Directors of the Company consider they have conceded a handsome reduction, and are willing to light the lamps as soon as ever the Council enter into an agreement on the terms offered.

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Bolton Corporation Water Supply.—From a recently issued statement it appears that the Bolton Corporation water-works capital account now stands at £819,488; large sums having been spent the last year or two in acquiring land and farms within the gathering ground on the Darwen side. The income during the past year for water supplied amounted to £60,830, as against £60,020 in 1897, and £56,522 in 1896. The Borough Treasurer was enabled to effect a saving by securing loans at lower interest, the amount being £25,937, against £26,499. The profit transferred in aid of rates was £13,848; and it is of interest to note that on no previous occasion has the sum exceeded £12,000.

Fatality through an Accident to a Gas-Engine.—Last Saturday night an accident of an extraordinary character occurred at the works of the Scottish Cold Storage and Ice Company, Glasgow. It is said that the valve of a gas-engine got out of order, and caused an explosion, which set free an immense quantity of ammonia gas. There were eight men on the premises, including Mr. Henry Carphin, the Manager of the works; and they were all overtaken with dense vapour. Several of them were able to make their way to the street and were soon out of danger; others were unable to leave the building immediately, and were rendered unconscious by the powerful fumes. With the exception of the Manager, they were rescued alive, and are likely to recover. Mr. Carphin succumbed to the deadly vapour. Owing to the poisonous condition of the atmosphere for a considerable distance on all sides, it was impossible to get near the building.

Sale of Stocks and Shares.—The following stocks and shares have lately been disposed of by auction by Messrs. Kidwell and Son, of Chatham: Four £50 "A" shares in the Rochester, Chatham, and Strood Gaslight Company, at £128 each; four at £129 each; and one for £130. Eleven "B" shares of £12 10s. were disposed of at £22 10s. apiece. Five "C" shares of £3 6s. 8d. were sold at £6 10s. per share; and five similar shares at £6 15s. For eight "D" shares of £8 10s., £24 per share was paid. A similar price per share was given for fifteen £10 "B" shares in the Sheppy Gas Company; while five £10 "C" shares produced £17 each. In the Gravesend and Milton Gas Company, £48 per share was paid for five £20 shares (old issue); and six similar shares of the new issue went for £37 each. Eight £20 shares in the Sittingbourne Gas Company found purchasers at £35 per share; and for seven others, £34 was paid. A lot of £33 6s. 8d. 7 per cent. Maidstone gas stock found a purchaser at £87; and £21 3 per cent. perpetual debenture stock was sold for £23. For £102 of consolidated "B" stock in the Canterbury Gas and Water Company, £237 was paid.

The Lighting of the Streets of Plymouth.—On the recommendation of the Works Committee the Plymouth Town Council decided yesterday week to complete the agreement for the purchase of the lamp columns, brackets, and lanterns from the Gas Company, and to employ their own staff for the lighting and cleaning of the lamps. It was also decided to light one or two streets with incandescent burners, on the system recommended by Mr. Bellamy, of Liverpool, in the report which has already appeared in the "JOURNAL." Alderman Phillips said that Mr. Bellamy's report on the system of incandescent lighting was exceedingly good; but the Committee thought it better to try it experimentally, rather than at once adopt the experience of another town where the circumstances might be very different from their own. Mr. Debnam, the Chairman of the Electric Lighting Committee, hoped the experiment would be made in a district where the lighting was bad, and not where it was good, so that they might really be able to test how far incandescent burners could economically and usefully supplant the lights already in use. Alderman Phillips said the Committee would take care that the experiment was carried out in a proper manner.

Public Lighting of Lowestoft.—A tender for the public lighting of Lowestoft during the period ending June 24 next was submitted by the Gas Company at the meeting of the Town Council last Tuesday; and it was accepted, although, according to the Surveyor, the new terms will represent an additional charge of £100 per annum. The Company are to supply the ordinary lamps with 4 cubic feet of gas per hour for 2250 hours, for £1 11s. 6d. per lamp, and provide the necessary fittings and clean, light, extinguish, and repair the lamps for 18s. each per annum. Any extra quantity of gas consumed by lamps lighted over the time specified is to be charged at 3s. 6d. per 1000 cubic feet. The Sugg lamps, with duplex incandescent burners supplied by meter, are to be charged at 50s. a year each, and 4s. meter-rent; the gas consumed being charged at 3s. 6d. per 1000 cubic feet. The Company are also willing to supply incandescent lights in the existing lanterns, and maintain them to the best of their ability to June 24, and light them in accordance with the authorized times for 2250 hours, and the pilot light for 6510 hours for £3 per lamp, all expenses and gas included. In connection with this subject, it may be mentioned that Mr. W. C. C. Hawtayne has been appointed to draw up a detailed scheme, with plans and specifications, for lighting the borough by electricity.

The Proposed Purchase of the Devonport Water-Works.—Strong opposition is likely to be raised to the scheme of the Devonport Corporation for the purchase of the water undertaking. Last week a private meeting of opponents of the scheme was held for the purpose of organizing opposition; and among those who attended were several members of the Town Council. A strong point with these and other gentlemen present at the meeting was that the information furnished to the Council was so scanty as to be almost worthless. It was decided to present a requisition to the Mayor to call a public meeting of ratepayers to discuss the question. Such a meeting seems, however, to have been decided upon independently of the requisition; and it will be held this week. In the meantime Mr. Whitfeld, the Chairman of the Water Committee, promises that the information which was not given at the Council meeting shall be tendered at the meeting of ratepayers. In his opinion it will "wholly dispel the sensational figures that have been so precipitately flourished" by the opponents of the scheme. It is perhaps worthy of note that Devonport is receiving its full supply of water, while in the neighbouring borough of Plymouth (where the works are under municipal control) the supply has been curtailed. Mr. H. Frances, the Engineer of the Devonport Water Company, is reported to have said that there is no immediate danger of the supply running short.

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Tendring Hundred Water Company.—The annual meeting of this Company was held last Friday. The accounts which were presented showed a revenue from all sources of £4347, as against £4093 in the previous year; while the total expenditure amounted to £1955. The gross profit for the year was £2392; and the balance available for dividend was £1335. A dividend of 3 per cent. on the "A" shares (making with the interim dividend 4½ per cent. for the year), and of 1 per cent. on the "B" shares was declared.

Local Authorities and Water Divining.—Last year the Porthcawl District Council were surcharged by the Government Auditor (Mr. Dolby) the amount of fees paid to a water diviner whom they had employed in their efforts to reach a supply of water. At this year's audit, held on Saturday week, Mr. Dolby further surcharged the Council £248, spent in sinking a well on a "diviner's" advice. Last year the Council appealed to the Local Government Board against the surcharge then made; but the matter has not yet been decided.

The Nidd Water Scheme of the Bradford Corporation.—The members of the Bradford City Council visited the Gowthwaite compensation reservoir last Wednesday in connection with the new Nidd water-works; and at the close of the inspection, the party dined together at Pateley Bridge. A few remarks made by Alderman Holdsworth, the Chairman of the Water Committee, in responding to the toast of his health, show the position arrived at by these important works. He said he felt convinced that in course of time the Water Committee would possess an undertaking as productive as that of any other department. For the present, it was not altogether satisfactory to reflect that, notwithstanding a growing revenue, the financial statements showed that they were losing £7000 or £8000 each year. Dealing with the progress of the new works, Alderman Holdsworth stated that above 100,000 cubic yards of excavations had been made, and 80,000 cubic yards of masonry and concrete laid; while three miles of new road, four road bridges, and 13,000 yards of boundary walls and fences had been constructed. In the Rain Stang tunnel, 2338 yards of the total of 2486 yards had been made. The Burn tunnel, which was 1800 yards long, had been completed; and 5000 yards had been worked in the Greenhow tunnel—leaving 1200 yards to be excavated. From Greenhow south to Chellow Heights, the works were practically completed. On the Barden branch 3065 yards had been worked, out of a total of 4940 yards. At Chellow Heights reservoir and filter-beds, £33,000 had been spent out of a total of £60,000.

Chesterfield Rural District Water Supply.—Mr. H. P. Boulnois, of the Local Government Board, held an inquiry on Friday at Chesterfield, in connection with an application by the Rural District Council for permission to borrow money for the extension of the northern water supply system. According to Mr. E. M. Eaton, the Consulting Engineer, the Authority already have control of 2000 acres of gathering-ground for the purposes of the northern district supply; but they lack reservoir storage. It is intended to construct a reservoir of a capacity of 71 million gallons. It is proposed to apportion the cost of the scheme as follows: Barlow, £955; Beighton, £11,029; Coal Aston, £850; Dronfield Woodhouse, £950; Eckington, £14,346; Holmsfield, £561; Killamarsh, £4217; Staveley, £14,551; Unstone, £1352. The inquiry embraced an application by the Dronfield District Council for sanction to borrow £5189.

Messrs. Hoskins Bros. and Messrs. Mepham and Fergusson, Australian firms, are reported to have secured contracts for supplying the Coolgardie water scheme with pipes. The amount of tenders offered for the work was no less than £1,025,124.

The new works which Messrs. Fletcher, Russell, and Co., Limited, are having erected at Warrington are fast approaching completion; and when they are in full working order, they will find employment for some 700 to 800 men. Since the work commenced in September of last year, a large amount of additional work beyond the contract has been ordered. The original contract was for a foundry 168 ft. by 184 ft.; a fitting-shop, 172 ft. by 75 ft.; and a large warehouse (four storeys high), 120 ft. by 75 ft. The machinery is being brought in; and it is being fitted, so that, if necessary, it may be driven by electricity, and there are also electric hoists in the fitting-shops and warehouse. Tram lines are also being laid down, and very soon work can be commenced. The "extras" have almost doubled the work; and the area now covered by the undertaking is about 4 acres. Large and commodious offices have been erected at the front. They are 132 ft. long by 63 ft. wide. They are three storeys high; and the top storey will be used as the show-room. A large chimney, 138 feet high, has also been built; and it is a very prominent object from a long distance. By the side of the foundry a cupola has been erected, with three furnaces and the necessary staging Several other buildings connected with the various departments of work carried on by the firm are also practically ready for operation.

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JOHN L. COCKER,
Secretary and General Manager.
Gas Office and Works, Merthyr Tydfil,
Glamorganshire, Sept. 10, 1898.

MERTHYR TYDFIL GAS COMPANY.

WANTED, a competent Man to repair and test Wet and Dry Gas-Meters. Wages, 30s. per week.
Applications, stating Age, where last employed, with References as to Character and Experience, to be addressed to the undersigned not later than Friday, the 30th inst.

JOHN L. COCKER,
Secretary and General Manager.
Gas Office and Works, Merthyr Tydfil,
Glamorganshire, Sept. 10, 1898.

SECRETARY WANTED.

THE Directors of the Sheppy Gas Company are desirous of receiving APPLICATIONS from duly qualified persons, to undertake the duties of SECRETARY in December next. The Salary will be £200 per annum, without Residence. The applicant must be between 30 and 40 years of age, and have a good knowledge of up-to-date Gas Business, including Prepayment Meters, Stoves, Ranges, and General Fittings, on sale or hire, as well as regular Secretarial Work. He will have the assistance of a thoroughly good Assistant and Collector, who resides at the Office. One previously engaged under a Provincial Company will be preferred.
Applications in own writing to be addressed to the Chairman, Gas Office, 2, Trinity Road, Sheerness-on-Sea, endorsed "Secretaryship," and be delivered not later than the first morning delivery on Wednesday, the 12th of October next.

By order,
A. W. MARKS,
Secretary.
Gas Company's Office, Sheerness-on-Sea,
Sept. 14, 1898.

WANTED, an experienced Young Man as DRAUGHTSMAN. Must be well up in Gasholders and General Constructional Ironwork, both as regards Estimating and Drawings.
Address Messrs. CLAYTON, SON, AND Co., LIMITED, Hunslet, LEEDS.

WANTED, a Clerk, not under 20 years of age, who has had experience in the General Office of a Gas-Works, and who could assist in the Engineer's Department. Wages 25s. per week.
Apply, by letter, stating Age and full Particulars of Experience, to No. 3133, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, Carbon in 4 Ton Lots, or more; also OIL CARBON.
State Price, f.o.r. at nearest Station, to No. 3031, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Set of Four Second-hand PURIFIERS, 10 ft. by 10 ft., with Valves and Connections and Lifting Gear, complete. Must be in good condition, and Price moderate.
Address No. 3126, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

OFFERS wanted for about 3 Tons of CARBON
Apply to T. MAINMAN, Secretary, Gas-Works, KNARESBOROUGH.

FOR SALE—Small Gas-Works, making nearly 1½ millions a Year. Capable of being doubled by energetic Man.
Apply to GEORGE TOVEY, Winchcombe, R.S.O., GLOS.

FOR SALE, Cheap—One (nearly new) 4800 cubic feet per hour STATION METER; and two 6-inch STATION GOVERNORS.
Apply, by letter, to No. 3129, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. **Compare Prices and Particulars before ordering elsewhere.**
J. F. BLAKELEY, Gas Engineer, Ravensthorpe, YORKS.

FOR SALE—One Station Meter (3-inch Inlet and Outlet, connection to Bye-Pass 4 inch), in good working order; one HYDRAULIC MAIN, U, 18-inch, 6 ft. 9 in. long; five ARCH-PIPES and DIPS, 4-inch; four MOUTHPIECES, 15-inch, round, with LIDS.
Address F. M. MAULDON, Secretary, Gas Company, MANNINGTREE.

GAS-WORKS, GRINGLEY-ON-THE-HILL.

TO BE SOLD, Privately—A small COUNTRY GAS-WORKS in good Condition—comprising Machinery, Mains, Services, Meters, &c. Also two newly-built COTTAGES and Gardens on the Site, and sufficient Ground for large Coal-Yard, or two more Cottages. This is a first-rate opening for a Smith or Plumber.
For Particulars apply to H. & F. BAILEY, Gas Engineers, EAST RETFORD.

RAMSGATE CORPORATION.
(GAS AND WATER DEPARTMENT.)

THE following required:
250 12-feet lengths of 12-inch GAS-PIPES.
10 Tons ORDINARY SPECIALS, various diameters
Tenders to be sent in not later than Sept. 30, addressed to the Chairman of the Gas and Water Committee, Hardres Street, Ramsgate.
The Committee do not bind themselves to accept the lowest or any Tender.
Full Particulars on application to William A. Valon, Engineer.

W. A. HUBBARD,
Town Clerk.

COMMERCIAL GAS COMPANY.

THE Directors of the Commercial Gas Company are prepared to receive TENDERS for the surplus BREEZE produced at their several Works for the Twelve Months ending the 30th of Sept., 1899.
The quantities are estimated to be as under, but the same cannot be guaranteed, and may be more or less:
At the Stepney Works on the Regent's Canal—
1500 chaldrons (of 48 bushels) of Fine Coke Breeze, and
1500 chaldrons (of 48 bushels) of Rough Pan Breeze.
At the Wapping Works, on the River Thames—
2000 chaldrons (of 48 bushels) of Fine Coke Breeze, and
2000 chaldrons (of 48 bushels) of Rough Pan Breeze.
At the Poplar Works, in Bow Creek (free waterway)—
4000 chaldrons (of 48 bushels) of Fine Coke Breeze, and
4000 chaldrons (of 48 bushels) of Rough Pan Breeze.
The Tenders may be for the whole or for one or more Works separately.
The Contractors must give security to remove the Breeze as it accumulates, to pay for the same monthly, and generally for the due fulfilment of the Contract.
The Form of Agreement to be signed can be seen at the Company's Offices.
Tenders, sealed and endorsed "Tender for Breeze," to be delivered here not later than the 6th of October prox.
The Directors reserve to themselves the right to accept any Tender in part or in whole, and do not bind themselves to accept the highest or any Tender.
Commercial Gas-Works, Stepney, E.,
Sept. 16, 1898.

BLACKPOOL CORPORATION.

THE Gas Committee are prepared to receive TENDERS for the surplus TAR produced during the next Twelve Months from Sept. 30, 298. About 2000 Tons.

Tenders, endorsed, to be sent to the Chairman by the 24th of September.

JOHN CHEW,
Gas Engineer.

Gas Office, Princess Street,
Blackpool.

CHEPSTOW GAS COMPANY.

TENDERS FOR COAL.

THE Directors of the above Company invite TENDERS for the supply of 1200 to 1400 Tons of best large GAS COAL, COBBLES, or NUTS for One Year.

Tenders to state the name of Coal offered, and the price per ton delivered free at Chepstow Station.

The Directors reserve to themselves the right to accept the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any Tender.

Tenders, addressed to H. Gillam, Chairman, and endorsed "Tender for Coal," to be delivered at the Office of the Company on or before the 26th of September.

By order,
J. L. RUST,
Manager.

CITY OF HEREFORD.

THE Gas Management Committee of the Corporation invite TENDERS for the supply of best screened large SOUTH WALES COAL for One Year.

Prices to be quoted at the Pit's Mouth, also delivered free at the Gas-Works Siding, Hereford, in such quantities as may be required from time to time.

The estimated quantity required will be from 6000 to 8000 Tons.

Full Particulars and Printed Forms of Tender may be obtained on application to the undersigned.

Tenders, endorsed "Tender for Gas Coal," are to be sent in addressed to the Chairman, Gas Management Committee, Mansion House, Hereford, by Saturday, Sept. 24.

The Committee do not bind themselves to accept the lowest or any Tender.

By order,
WILLIAM PARLBY,
Gas Engineer and Manager.

Gas-Works, Hereford,
Sept. 14, 1898.

TO CONTRACTORS.

GASHOLDER TANK.

THE Edinburgh and Leith Corporations' Gas Commissioners are prepared to receive TENDERS for the EXCAVATORS', CONCRETORS', BRICKLAYERS', and MASONS' WORK in connection with the construction of a BRICK and PUDDLE GASHOLDER TANK, 252 ft. 6 in. diameter by 37 feet deep at their New Works at Granton, near Edinburgh.

Specification and Schedule of Quantities may be obtained on application to the Engineer, Mr. W. R. Herring, on payment of a sum of £5, which will be returned on receipt of a *bonâ-fide* Tender. The Drawings and Sections may be inspected, and any further Information obtained upon application to the Engineer at his Office, New Street, Edinburgh.

Tenders are to be lodged by Ten a.m. on the morning of the 17th day of October, endorsed "Tender for Gasholder Tank," and addressed to the undersigned.

The Commissioners do not bind themselves to accept he lowest or any Tender.

JAMES M'G. JACK,
Clerk to the Gas Commissioners.

25, Waterloo Place, Edinburgh.

BRITISH GASLIGHT COMPANY, LIMITED.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at this Office on Wednesday, the 28th inst., at Half-past Twelve o'clock precisely, to transact the usual Business, to declare a Dividend for the Half Year ended the 30th of June last, and to elect two Directors and one Auditor in place of those who go out by rotation, but who are eligible to be re-elected.

Notice is Hereby also Given, that the TRANSFER BOOKS of the Company WILL BE CLOSED on the 17th inst., and RE-OPENED on the 29th inst.

By order of the Court of Directors,
H. B. CHAMBERLAIN,
Secretary.

Chief Office: No. 11, George Yard,
Lombard Street, London, E.C.,
Sept. 7, 1898.

HOYLAKE AND WEST KIRBY GAS AND WATER COMPANY, LIMITED.

SALE OF SHARES (GAS UNDERTAKING ONLY), STANDARD DIVIDEND 7 PER CENT., SUBJECT TO SLIDING-SCALE.

PURSUANT to the Provisions of the Hoylake and West Kirby Gas Order, 1897, I Hereby give Notice of the intention of the above-named Company to offer for SALE BY TENDER, not more than ONE THOUSAND AND SEVENTY-NINE SHARES of the nominal value of FIVE POUNDS each; being the balance of £9000 New Capital authorized to be raised for the purposes of the Gas Undertaking under the terms of the afore-mentioned Hoylake and West Kirby Gas Order, 1897.

Forms and Conditions of Tender may be obtained from the undersigned, to whom sealed Tenders, marked "Capital Tender," must be delivered not later than Ten a.m., on Wednesday, the 12th day of October next.

ARTHUR GEO. READDY,
Secretary.

Dated Sept. 17, 1898.
Registered Offices:
8, Filey Terrace, Hoylake.

NOW READY.

Foolscap 4to, pp. 535, with 239 Illustrations and Steel Plate Engraving (as Frontispiece) of WILLIAM MURDOCH, *Inventor of Gas Lighting.*

Morocco Gilt, 21s.; Roan Gilt, 18s.

THE SIXTH (AND CENTENARY) EDITION

OF THE

HANDBOOK

FOR

GAS ENGINEERS AND MANAGERS.

BY

THOMAS NEWBIGGING,

M.Inst.C.E.

This Edition of the "Handbook for Gas Engineers and Managers" is a great improvement on all previous editions. Much of the text has been re-written, in order to keep the work abreast of the constant advances that are being made in the Gas Industry. About fifty additional Illustrations are given; and a Steel-Plate Engraving of William Murdoch, the Inventor of Gas Lighting.

PRINCIPAL CONTENTS.

Introduction; Chief Kinds of Coal; Analyses of Coals and Cannels; Storage of Coal; Spontaneous Ignition of Coal; Gases Occluded in Coal; Testing of Coal for its Producing Qualities; Gas Production; Retort-House; Inclined or Sloping Retorts; Retort-Stack; Retorts; Retort-Settings; Regenerative System of Heating Retorts; Flues and Draught; Analysis of Furnace Gases; Retort-Bench Mountings; Hydrocarbon and other Gases and Vapours; Retort-House Tools and Appliances; Machine Charging and Drawing; Condensation; Naphthalene; Condensers; Exhausters; Steam Engines and Boilers; Washers; Tower Scrubbers, Washer-Scrubbers; Bye-Pass Mains and Valves; Tar and Liquor Wells and Tanks; Purification; Purifying-House; Purifiers; Limestones and Lime Burning; Station Meter and other Indicating and Recording Apparatus; Gasholder Tanks; Gasholders; Governors; Main-Pipes; Main-Pipe Joints; Wrought-Iron and Steel Main-Pipes; Laying of Main-Pipes; Discharge of Gas through Main-Pipes; Service-Pipes and Fittings; Public Lighting; Consumers' Gas-Meters; Testing-Meters; Internal Fittings; Gas Testing Appliances and Methods; Tests for Impurities; Illuminating Power; The Aerorthometer; Foreign and other (proposed) Home Standards of Light; Jet Photometers; Specific Gravity of Gas; Enrichment of Coal Gas; Public Illuminations; Coloured Fires; Illumination Devices; Use of Gas for Purposes other than Lighting; Residual Products; Coal Tar; Ammoniacal Liquor; Sulphur Recovery; Coal Products; Elementary Substances; Chemical and other Memoranda; The Gas Industry; Cost of Gas-Works; Miscellaneous; Bricks and Brickwork; Mortar and Concrete; Iron, Steel, and other Metals; Velocity and Force of the Wind; Office Memoranda; Epitome of Mensuration; Arithmetical and Algebraical Signs; Multipliers; Table of Diameters, Circumferences, Areas of Circles and Sides of Equal Squares; Weights and Measures; French Weights and Measures—Decimal System; Money Tables.

LONDON:

WALTER KING, 11, BOLT COURT,

FLEET STREET, E.C.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held MONTHLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by Auction of Gas and Water Stocks and Shares under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. Alfred Richards's Offices, 18, FINSBURY CIRCUS, E.C.

By order of the Directors.

£22,900 FOUR PER CENT. PERPETUAL DEBENTURE STOCK

OF THE

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.

Offering to Trustees and others an Investment of the highest class.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, Tokenhouse Yard, London, E.C., on Tuesday, Oct. 18, 1898, at Two o'clock precisely, in Lots.

Particulars may be obtained at the HEAD OFFICES OF THE COMPANY, D'Olier Street, DUBLIN; and of the AUCTIONEER, 18, Finsbury Circus, LONDON, E.C.

By order of the Directors of the

PLYMOUTH AND STONEHOUSE GASLIGHT AND COKE COMPANY.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, E.C., on Tuesday, Oct. 18, at Two o'clock, in Lots,

£10,000 OF ORDINARY STOCK

OF THE

PLYMOUTH AND STONEHOUSE GASLIGHT AND COKE COMPANY,

Ranking for a Standard Dividend of 5 per cent., subject to the Sliding-Scale; the last Dividend on similar Stock in the Company having been at the rate of 6½ per cent.

Particulars may be obtained at the COMPANY'S OFFICES, 1, Athenæum Terrace, PLYMOUTH; and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

SOUTHEND WATER-WORKS COMPANY.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, E.C., on Tuesday, Oct. 18, at Two o'clock, in Lots,

500 £10 SHARES

(issued as fully paid) in the above Undertaking, ranking for a Maximum Dividend of 7 per cent.; the last Dividend on similar Shares having been 5½ per cent.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Executors of the late G. E. Wood, Esq.

389 £10 SHARES IN THE

HAMPTON COURT GAS COMPANY

AND THE

WALTON-ON-THAMES AND WEYBRIDGE GAS COMPANY.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Oct. 18, at Two o'clock precisely, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

KING'S LYNN GAS COMPANY.

Issue of £1000 PREFERENCE FOUR PER CENT STOCK, under the King's Lynn Gas Order, 1888, confirmed by the Gas Orders Confirmation (No. 2) Act, 1888, and £6400 PREFERENCE FOUR PER CENT. STOCK, under the King's Lynn Gas Order, 1898, confirmed by the Gas Orders Confirmation (No. 1) Act, 1898.

NOTICE is Hereby Given, that, on the 8th of October, 1898, the Directors will receive TENDERS for the purchase of the ABOVE STOCK in 74 Lots of £100 each.

Printed Conditions and Forms of Tender may be had on application, by post or otherwise, to the Manager, Gas-Works, King's Lynn, or to the undersigned.

By order,
J. J. COULTON
F. H. PARTRIDGE } Clerks.

King's Lynn, Sept. 6, 1898.

JAMES OAKES & Co.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—**Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.**

Now Ready, Crown 4to., Price 3s. 6d.

GASHOLDER AND TANK

(Of One Million Cubic Feet Capacity)

AT THE

SUTTON GAS-WORKS.

Designed and carried out by

F. SOUTHWELL CRIPPS, Assoc.M.Inst.C.E.,

MEMBER OF THE INSTITUTION OF GAS ENGINEERS, MEMBER OF THE SOCIETY OF ARTS, CONSULTING ENGINEER.

EMBRACING NOTES ON GASHOLDER CONSTRUCTION GENERALLY.

REPRINT OF A SERIES OF ARTICLES IN THE "JOURNAL OF GAS LIGHTING," &c., WITH THE ACCOMPANYING PLATES.

Other Works by the same Author.

The Guide-Framing of Gasholders, and Strains on other Structures in Gas-Works	6s. 0d.
Gasholders With or Without Guide-Framing: A Discussion; and Literature on Gasholder Construction	1s. 0d.
Flow of Gas, and Proportioning Gas-Mains	7s. 6d.

PUBLISHED BY

WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

THOMAS DUXBURY & CO.,

16, DEANSGATE, MANCHESTER.

Best Gas Coal and Cannel, giving High Illuminating Power, Large Yield per ton, and reasonable in Price.

Telegrams: "DARWINIAN, MANCHESTER." Telephone 1806.

COKE-BREAKERS,

PRICES REDUCED.

(THOMAS & SOMERVILLE'S PATENT)

With Elevators and Conveyors worked by Steam or Gas Engine.

GEORGE WALLER & CO.,

165, QUEEN VICTORIA STREET, E.C.

And at STROUD, GLOUCESTERSHIRE.

THOMAS TURTON AND SONS, LIMITED,

SHEAF WORKS, SHEFFIELD,

MANUFACTURERS OF

FILES OF BEST QUALITY FOR ENGINEERS.

STEEL OF ALL DESCRIPTIONS.

SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.

LONDON OFFICE:

90, CANNON STREET, E.C.

THE SILICA FIRE-BRICK COMPANY,

OUGHTIBRIDGE, near SHEFFIELD,

MANUFACTURE

SILICA BLOCKS, BRICKS, AND CEMENT

OF SUPERIOR QUALITY

FOR GAS-FURNACES.

Trade Mark: "SILICA."

These Goods (largely used in Gas, Glass, Iron, and Steel Works) are, on account of their

GREATER DURABILITY,

Strongly recommended where EXCESSIVE HEATS have to be maintained.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY,

LIMITED,

NEWBATTLE COLLIERIES,

DALKEITH, N.B.

GAS PURIFICATION BY HYDRATED OXIDE.

THIS Material is of full Strength, and Exceptional Activity. It is specially prepared to minimize Back-Pressure; and will be supplied on Hire, or Sold, on the most favourable Terms.

SPENT OXIDES containing Blue, also CRUDE FERRO-CYANIDE PRODUCTS, either PURCHASED or EXCHANGED for FRESH OXIDE.

MANCHESTER OXIDE COMPANY, LTD.,

CANAL ST., MILES PLATTING, MANCHESTER.

THORNLEY GAS COALS

WORKED BY THE

WEARDALE IRON & COAL Co., Ld.

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by

Messrs. J. & H. S. PATTINSON, *May 28, 1895.*

Yield of Gas per Ton . .	10,500 Cub. Ft.
Illuminating Power . .	16·9 Candles.
Coke (of good quality) . .	67·5 per Cent.
Sulphur	0·58 ,,
Ash	2·78 ,,

For Price, &c., apply to the

WEARDALE IRON & COAL Co., Ld.

QUAYSIDE, NEWCASTLE-ON-TYNE.

HOLMSIDE GAS COALS.

Present Daily Produce over 5000 Tons.

Latest Analysis—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation

Yield of Gas per Ton . . .	11,205 Cubic Feet.
Illuminating Power	16$\frac{7}{10}$ Stand. Sperm. Candl.
Coke (of good & pure quality)	13$\frac{3}{4}$ Cwt. per Ton.
Sulphur	A little over 1 per Cent.
Ash	Under 1 per Cent.
Tar	163 lbs. (Avoir.) per Ton.
Ammoniacal Liquor	103 lbs. (Avoir.) per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

Present Daily Produce available 3000 Tons.

Of equal quality to the "Holmside" Coal, and also very largely used by many Gas Companies at Home and Abroad.

Both descriptions are shipped at Tyne Docks, and Dunston Staiths, River Tyne, also at North and South Docks, Sunderland.

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,

HOLMSIDE & SOUTH MOOR OFFICES,

NEWCASTLE-UPON-TYNE.

AUTOMATIC METER REGISTER

The Meter Life Book specially adapted, and revised for "Slot" Meter Registration by

ROBERT P. KEYS.

In sizes to record 1000 Meters, with Index, Half Bound	£2	2	0
To record 500 Meters	£1	15	0
To record 250 Meters	£1	11	6

The only Easy System yet projected.

PUBLISHED BY

WALTER KING, 11, Bolt Court, Fleet Street, E.C.

PRICE'S COKE & COAL BARROW

effects a great saving of time, labour, and expense.

For Particulars, Price, &c., apply to Mr. EDWARD PRICE, 119, Queen's Road, FINSBURY PARK, N.

Prices are Reduced.

HEATHCOTE GAS COAL.

Rich in Illuminating Power and Yield of Gas. Above the Average in Weight and Quality of Coke.

Maintains a High Standard in Residuals.

THE GRASSMOOR CO., Ld.

CHESTERFIELD.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD

BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.

RAVENSTHORPE, NEAR DEWSBURY.

LONDONDERRY GAS COALS

FROM THE

MARQUIS OF LONDONDERRY'S COLLIERIES,

COUNTY OF DURHAM.

Available output up to 5000 tons per day. Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

S. J. DITCHFIELD,

SEAHAM HARBOUR, COUNTY OF DURHAM.

WELDON MUD

FOR

GAS PURIFICATION,

For use in the

RECOVERY OF SULPHUR,

ALSO

Removal of last Traces of SULPHURETTED HYDROGEN in catch position.

Full Particulars on application to the Patentees:

GAS DESULPHURIZATION CO.,

— LIMITED, —

1, FENCHURCH AVENUE, LONDON, E.C.

TROTTER, HAINES, & CORBETT,

Brettell's Estate

FIRE-CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Proprietors of

BEST GLASSHOUSE POT & CRUCIBLE CLAY.

SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

LONDON OFFICE: R. CULL, 84, OLD BROAD ST., E.C.

HEBBURN MAIN GAS COALS.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·4 candles.
Coke . . . . . 68 per cent.

For Prices, f.o.b. Ship or Delivered by Rail, apply to

THE WALLSEND & HEBBURN COAL COMPANY, LTD.

8 Lombard Street,

NEWCASTLE-ON-TYNE.

W. RICHARDSON, Fitter.

BOLDON GAS COALS.

ANALYSIS.

Yield of Gas per ton .	10,500	Cubic Feet.
Illuminating Power . .	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

For Prices, &c., apply to

W. H. PARKINSON,

THE HARTON COAL CO., LTD.,

NEWCASTLE-ON-TYNE.

Telegraphic Address: "PARKINSON NEWCASTLE."

WATERBLEAN PAINT

TELEGRAMS: "EVESON, BIRMINGHAM."

EVESON FOR CANNEL

TUBES AND FITTINGS

ALL KINDS

WRITE FOR PRICES

STAFFORDSHIRE TUBE Co., BIRMINGHAM.

Lanemark Coal Co.,

LIMITED.

LANEMARK CANNEL AND GAS COALS.

Quotations and Analysis on Application to

LANEMARK COLLIERY,

NEW CUMNOCK, N.B.

Shipping Ports: All the principal Scotch Ports.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE

BOGHEAD CANNEL.

Yield of Gas per ton . . . . . 13,155 cub. ft.
Illuminating Power . . . . . 38·22 candles.
Coke per ton . . . . . 1,301·86 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 17·3 candles.
Coke . . . . . 70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·3 candles.
Coke . . . . . 73·1 per cent.

For Prices and complete Analysis, apply to

THOS. W. DANCE & SONS,

COAL OWNERS, NEWCASTLE-ON-TYNE:

OR

E. FOSTER & CO.,

21, JOHN STREET, ADELPHI, LONDON, W.C.

HARRIS & PEARSON,

STOURBRIDGE, ENGLAND,

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS, FIRE-BRICKS, LUMPS, & TILES of Every Description.

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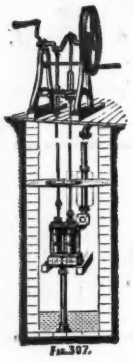

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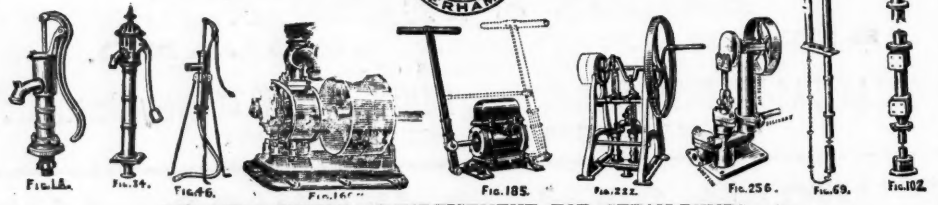

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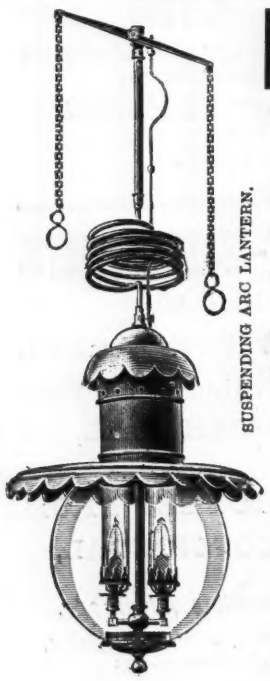

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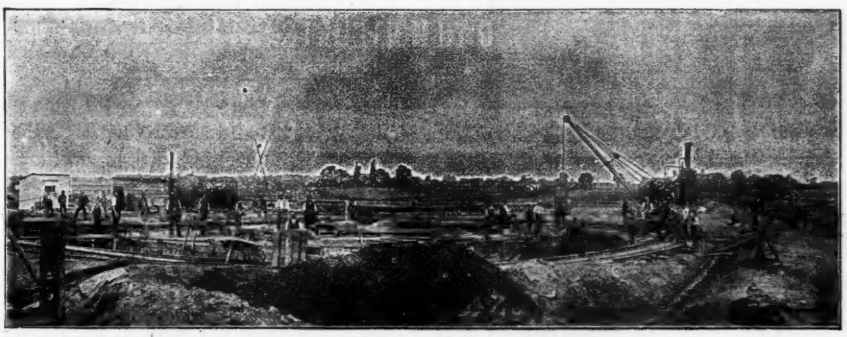

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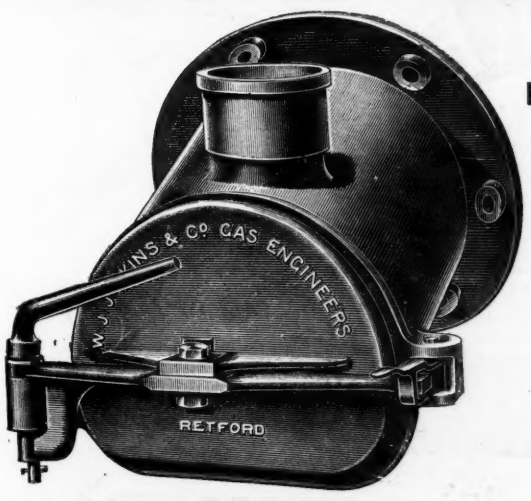

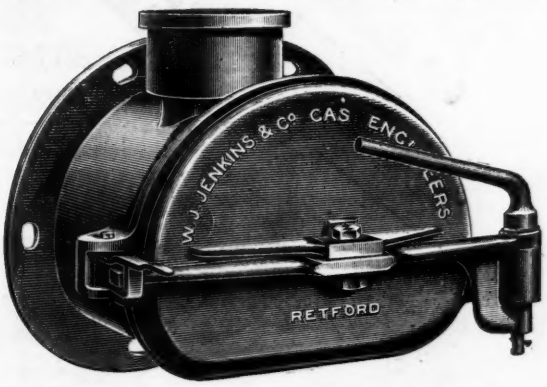

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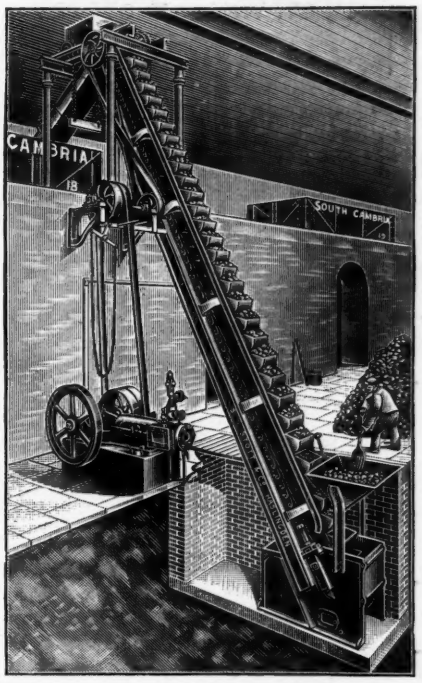

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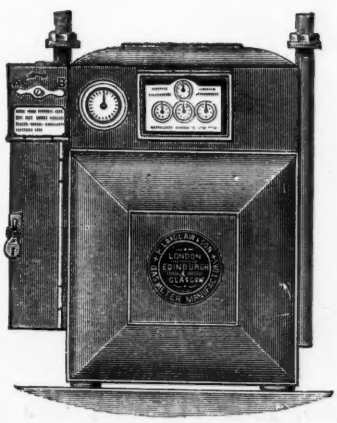

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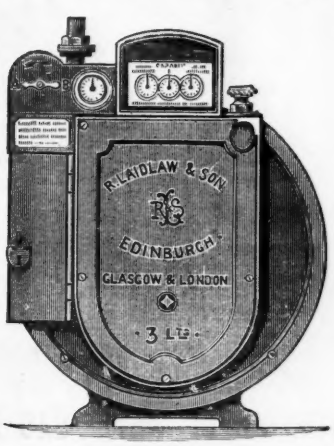

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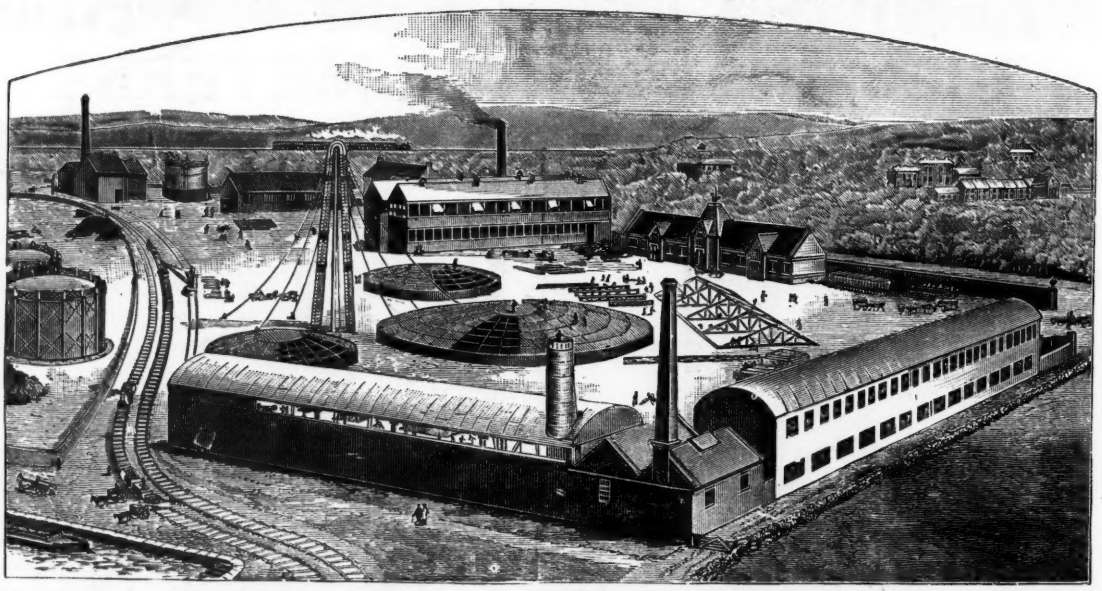

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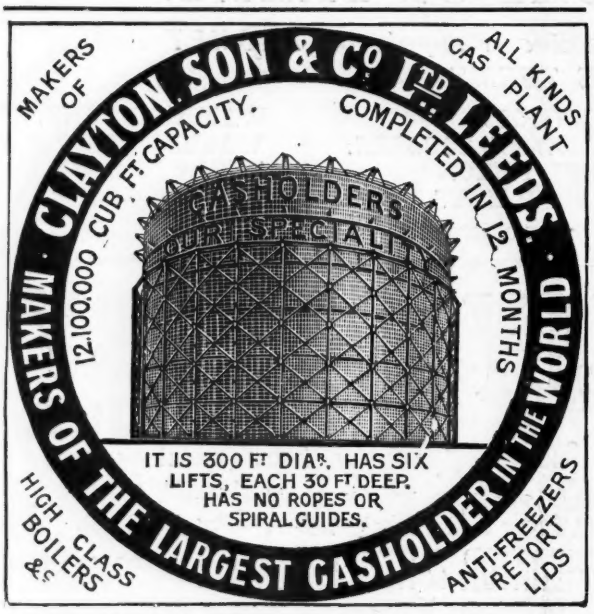
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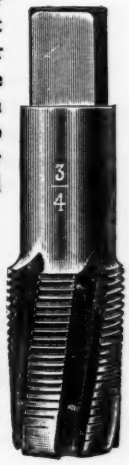

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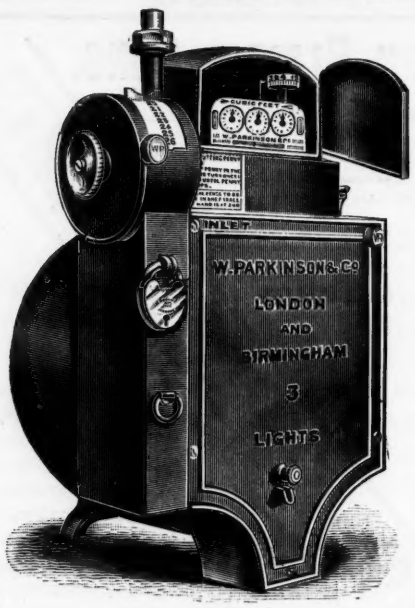

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[See also Advt. p. 628.

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